DRAFT – REMOVAL ACTION REPORT

FORMER EAGLEPICHER INCORPORATED FACILITY
DELTA, FULTON COUNTY, OHIO

Prepared for:

BUNTING BEARINGS, LLC

Prepared by:

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

Project No. 070-847

February 2, 2009

Civil & Environmental Consultants, Inc

Cincinnati 4274 Glendale Milford Rd • Cincinnati, Ohio 45242
Phone 513/985-0226 • Fax 513/985-0228 • Toll Free 800/759-5614 • E-mail cincinnati@cecinc.com

Chicago Cleveland Columbus Detroit Export Indianapolis Nashville Phoenix Pittsburgh St. Louis

Corporate Web Site http://www.cecinc.com

Cincinnati, Ohio
Toll Free 800/759-5614
E-mail cincinnati@cecinc.com

Chicago, Illinois
Toll Free 877/963-6026
E-mail chicago@cecinc.com

Cleveland, Ohio
Toll Free 866/507-2324
E-mail cleveland@cecinc.com

Columbus, Ohio
Toll Free 888/598-6808
E-mail columbus@cecinc.com

Detroit, Michigan
Toll Free 866/380-2324
E-mail detroit@cecinc.com

Export, Pennsylvania
Toll Free 800/899-3610
E-mail export@cecinc.com

Indianapolis, Indiana
Toll Free 877/746-0749
E-mail indianapolis@cecinc.com

Nashville, Tennessee
Toll Free 800/763-2326
E-mail nashville@cecinc.com

Phoenix, Arizona
Main Number 602/953-7705
E-mail phoenix@cecinc.com

Pittsburgh, Pennsylvania
Toll Free 800/365-2324
E-mail info@cecinc.com

St. Louis, Missouri
Toll Free 866/250-3679
E-mail stlouis@cecinc.com

February 2, 2009

VIA OVERNIGHT DELIVERY

Mr. Matthew J. Ohl
Remedial Program Manager
U.S. Environmental Protection Agency - Region 5
Office of Superfund - Remedial Response Branch (SR-6J)
77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Mr. Ohl:

Subject: Draft – Removal Action Report
Former EaglePicher Incorporated Facility
Delta, Fulton County, Ohio
CEC Project No. 070-847

On behalf of Bunting Bearings, LLC (Bunting), Civil & Environmental Consultants, Inc. (CEC) submits three copies of a draft Removal Action Report (RAR) for the former EaglePicher Incorporated (EPI) facility located at 200 Van Buren Street in Delta, Fulton County, Ohio. This report was prepared in accordance with the Administrative Order by Consent – Section V, 2.7 issued to EPI and Bunting Bearings Corp. (BBC) on March 31, 1998.

If you have any questions or require additional information, please call Mr. Jack Hilbert of Shumaker, Loop & Kendrick, LLP at (419) 321-1390.

Respectfully submitted,

CIVIL & ENVIRONMENTAL CONSULTANTS, INC.

David L. Click, CPG
Senior Project Manager

Paul R. Thomas
Senior Project Manager

cc: Kim Keogh - Bunting Bearings, LLC
John W. Hilbert, II, Esq. - Shumaker, Loop & Kendrick, LLP
Craig Melodia, Esq. - U.S. EPA
Omprakash Patel - Roy F. Weston

Civil & Environmental Consultants, Inc.

Cincinnati 4274 Glendale Milford Road
Cincinnati, Ohio 45242
Ph: 513/985-0226 / Fx: 513/985-0228
Toll Free 800/759-5614
E-mail cincinnati@cecinc.com
Corporate Web Site http://www.cecinc.com

Pittsburgh	800/365-2324	**Export**	800/899-3610
Chicago	887/963-6026	**Indianapolis**	877/746-0749
Cleveland	866/507-2324	**Nashville**	800/763-2326
Columbus	888/598-6808	**Phoenix**	602/953-7705
Detroit	866/380-2324	**St. Louis**	866/250-3679

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1.0 INTRODUCTION

Civil & Environmental Consultants, Inc. (CEC) conducted a non-time critical Removal Action (RA) at the former EaglePicher Incorporated (EPI) facility located in the Village of Delta, Fulton County, Ohio (herein referred to as the "Site" or "Delta facility" [see Figure 1]). The bulk of our work was performed on behalf of EPI. Following the bankruptcies of EPI and Bunting Bearings Corp. (BBC), the remaining work was performed on behalf of Bunting Bearings, LLC (Bunting). The RA described herein was performed in accordance with an Administrative Order by Consent (AOC) dated March 31, 1998 between U.S. EPA Region 5, EPI, and BBC. Following BBC's bankruptcy in 2002, Bunting bought the Site and other selected assets of BBC in a sale approved by the US Bankruptcy Court for the Northern District of Ohio. The AOC was issued pursuant to Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA). In addition, the RA was performed in accordance with an Action Memorandum dated September 1999, a Removal Action Work Plan (RAWP) dated October 1999 (CEC, 1999), and several RAWP Addenda (RAWPA) approved by U.S. EPA.

The RA was conducted between 1999 and 2008 to mitigate or eliminate the threat to public health, welfare, or the environment posed by the presence of constituents of potential concern (COPC), in particular total lead concentrations above 400 mg/kg. The overall scope of the removal action included off-site contaminated soil removal from residential areas immediately adjacent to the Delta facility, contaminated sediment/soil removal along Fewless Creek, and on-site impacted soil and foundry sand removal from areas beneath concrete/asphalt pavement and building structures/facilities.

This Removal Action Report (RAR) has been prepared to summarize the actions taken, the data results, and the estimated total costs incurred during the RA at the former EPI facility in the Village of Delta, Ohio.

1.1 REPORT ORGANIZATION

This RAR includes text and accompanying tables, figures, and appendices. Specifically, the RAR is organized into six sections, including: an Introduction (Section 1.0); Background (Section 2.0); Removal Action Objectives (Section 3.0); Removal Action Activities (Section 4.0); Estimated Total Cost (Section 5.0); and References (Section 6.0). The RAR consolidates activities, information, and data collected over nine years from several phases of work and presents these activities in chronological order to facilitate review. Further, due to the volume of laboratory analytical data presented in accordance with Level 4 Data Quality Objectives (i.e., Contract Laboratory Program [CLP]-like data package), original laboratory reports are presented on multiple compact discs.

Pursuant to Condition 2.9 of the AOC, the aforementioned sections include the following required components/information:

- Certification Statement (beginning of report);
- Chronological summary of actions taken and resources used (Section 4.0);
- Estimate of the total cost to complete the removal actions (Section 5.0);
- Listing of quantities and types of materials removed off-site or handled on-site (Section 4.0);
- Discussion of disposal options used for materials removed off-site or handled on-site (Section 4.0);
- Listing of the ultimate destinations of materials removed off-site (Section 4.0); and
- Presentation of the analytical results of sampling performed (Section 4.0).

1.2 SITE DESCRIPTION

The Delta facility occupies approximately five acres in the eastern portion of the Village of Delta, located in Fulton County, Ohio (Figure 1). The facility is situated in a mixed residential and commercial area, and the property is bordered by Van Buren Street to the West, Jackson Street to the East, Palmwood Street to the South, and a vacated alleyway along the north property boundary. The facility consists of manufacturing buildings (Plant Nos. 1, 2, and 3), several addon buildings to Plant Nos. 1, 2, and 3 (i.e., Buildings A-2, A-3, etc.), isolated warehouse/storage buildings, outdoor areas of operation (North Yard and South Yard), and employee parking lots (Figure 2).

Fewless Creek is a local drainage feature that enters the Site along the northwest property boundary and traverses the Site to the southeast. The creek flows in concrete piping beneath the western and central portions of the Site and in corrugated metal piping (installed as part of removal action activities) across the southeastern part of the Site.

2.0 BACKGROUND

The following sections present a discussion of the site background including Site History, previous environmental investigations, a previous Engineering Estimate/Cost Analysis EE/CA, and a previous Streamlined Risk Evaluation (SRE) performed for the Site.

2.1 SITE HISTORY

The Site has been used for industrial purposes since the early 1900s. Several phases of facility expansion have taken place since the facility's inception. Historic Site activities included the manufacturing of bronze alloys, bar stock and bearings since the 1930s. Early manufacturing operations used sand casting methods to produce the bar stock. The used foundry sand was cleaned of recoverable metal in an on-site differential sedimentation process and placed in a depression along the southern portion of the Site. This metal recovery process and on-site disposal of used foundry sand occurred from approximately 1932 until 1978. Sand casting operations were discontinued in 1982, and were replaced with continuous and centrifugal casting equipment.

EPI purchased the facility in 1967 and sold it to BBC in 1989. Bunting purchased the Site in 2004 and continues to operate the Site as an active bronze alloys manufacturing facility.

2.2 SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS

In 1985, OEPA collected soil samples at the facility and determined that lead concentrations on-site and in the area immediately adjacent to the Site exceeded background concentrations. In 1994, OEPA and U.S. EPA conducted an Integrated Assessment at the facility during which they collected additional soil samples, as well as samples of Fewless Creek sediment, surface water, and off-site private well water. Based on the investigations performed by OEPA and U.S. EPA, on-site soil, off-site soil, and Fewless Creek sediment required further assessment.

2.3 ENGINEERING ESTIMATE/COST ANALYSIS

Under the AOC executed in March 1998, EPI prepared an Engineering Evaluation/Cost Analysis (EE/CA) and supporting documentation (ENSR, 1999) that was submitted to U.S. EPA on June 3, 1999. The EE/CA was prepared for areas requiring removal actions and used by U.S. EPA to prepare an Action Memorandum for the Site. The EE/CA report was accepted by U.S. EPA on July 19, 1999 and a 30-day public comment period was initiated.

Following the public comment period and U.S. EPA's response to public comments, U.S. EPA prepared an Action Memorandum which included selected removal action alternatives. The three distinct areas/media requiring removal actions based upon the results of the SRE include:

- Off-site soil in mostly residential areas immediately adjacent to the Delta facility,
- Sediment/soil along Fewless Creek on the Site and immediately downstream of the Site to Main Street, and
- On-site soil and foundry sand fill areas.

Off-site soil sampling revealed that the majority of sampling locations contained total lead at concentrations less than the residential cleanup goal (400 mg/kg) established by the U.S. EPA. Off-site areas that contained total lead concentrations exceeding 400 mg/kg were located adjacent to, and generally adjoining the north, south, and east Site property boundaries. Off-site sampling also indicated that total lead concentrations exceeding 400 mg/kg were generally confined to the uppermost 6 to 12 inches of soil.

EE/CA sampling and analysis indicated that sediment and bank soil samples collected within Fewless Creek generally contained total lead concentrations less than the ecological cleanup goal of 200 mg/kg at depths greater than 12 inches bgs. Between Jackson Street and Main Street, portions of the creek were found to contain total lead concentrations less than the ecological cleanup goal. Lead concentrations exceeding the ecological cleanup goal in Fewless Creek sediment were identified from the facility culvert at the southeast portion of the plant to a point between Jackson and Main Streets. In general, EE/CA investigations indicated that total lead concentrations decreased significantly downstream of the Site. Portions of the bank soil along the north and south sides of Fewless Creek, near the facility culvert, were also identified as containing lead concentrations above 200 mg/kg.

EE/CA sampling and analysis also indicated that on-site soils contained total lead at concentrations generally less than the risk-based residential cleanup goal (400 mg/kg) established by U.S. EPA, with the exception of soil near and within the foundry sand fill area. The foundry sand fill area was tentatively identified in the northwest portion of the employee parking lot approximately 1 to 2 feet below the ground surface (bgs) and to depths of approximately 6 to 8 feet bgs. Approximately 2,320 cubic yards (yd^3) of material exceeding the 400 mg/kg residential cleanup goal were estimated within the Site boundaries.

The U.S. EPA accepted the EE/CA report and later prepared the Action Memorandum, which included the selected removal action alternatives. The removal actions selected by U.S. EPA are described in Section 3.0.

2.4 STREAMLINED RISK EVALUATION

In January 1999, U.S. EPA performed a Streamlined Risk Evaluation (SRE) and based upon the results of the SRE, a determination was made that a Non-Time Critical Removal Action was necessary at the Delta facility and immediately adjacent properties.

3.0 REMOVAL ACTION OBJECTIVES AND ALTERNATIVES

Removal action objectives and alternatives were established to provide an achievable goal for the Site after the removal actions were completed. In accordance with the objectives set forth in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), specifically 40 CFR 300.415(b)(3), ... *actions shall, as appropriate, begin as soon as possible to abate, prevent, minimize, stabilize, mitigate, or eliminate the threat to public health or welfare of the United States or the environment.* The overall goal of the removal action was to mitigate or eliminate any threat to public health, welfare, or the environment posed by the presence of constituents of potential concern (COPC) in off-site soil, on-site soil and foundry sand, and Fewless Creek sediments/bank soil.

Specific removal action objectives for the Delta facility included:

- Abate or prevent potential exposure of on-site workers, off-site residents and the environment to COPC at concentrations posing an unacceptable risk at the Site;
- Stabilize, encapsulate, treat or eliminate potential hazardous substances in soils and sediment that pose a potential for migration;
- <u>Off-site soils</u> - excavation and off-site disposal of soils exceeding the designated residential soil cleanup level of 400 mg/kg total lead;
- <u>Fewless Creek sediments and bank soil</u> - excavation and off-site disposal of sediments and bank soil exceeding the designated ecological cleanup level of 200 mg/kg total lead; and,
- <u>On-site soils and foundry sand</u> - on-site stabilization of foundry sand and excavation and off-site disposal of stabilized foundry sand and on-site soils exceeding the designated residential soil cleanup level of 400 mg/kg total lead.

The extent of removal actions required to achieve the stated objectives was identified in Figures 2-4 through 2-6 of the EE/CA Report (ENSR, 1999).

Seven removal action alternatives were evaluated during the EE/CA to address lead concentrations in soil and sediment (ENSR, 1999). These alternatives included:

Off-Site Soil

- Alternative 1 - Excavation and landfill disposal;
- Alternative 2 - Excavation with on-site stabilization and reuse as paving material or fill material;

On-Site Soil and Foundry Sand

- Alternative 3 - In-situ stabilization of on-site soil and foundry sand with a stabilization agent (e.g., cement kiln dust or proprietary chemical) and excavation and landfill disposal as a solid waste;
- Alternative 4 - In-situ stabilization/encapsulation of on-site soil and foundry sand with jet grouting;
- Alternative 5 - Excavation and hazardous landfill disposal;

Fewless Creek Sediment and Bank Soil

- Alternative 6 - Excavation and landfill disposal; and
- Alternative 7 - Excavation and landfill disposal and installation of a culvert from the Site to Jackson Street.

Each of these non-time critical removal action alternatives was evaluated by the U.S. EPA for effectiveness, implementability and cost. As indicated in the Action Memorandum (Appendix I), U.S. EPA selected Alternative 1 for off-site areas; Alternative 5 for on-site areas; and Alternative 7 for Fewless Creek.

4.0 REMOVAL ACTION ACTIVITIES

As stated in Section 1.0, the RA was performed from 1999 through 2008. From 1999 through 2005, several phases of removal activities were performed including remediation stabilization, transportation, disposal, facility relocation, construction, and restoration. From 2006 to 2008, additional RA activities were performed including soil investigations, risk assessment, and development of environmental covenants. These activities are best presented chronologically to understand how and why they were performed. In general, work proceeded from offsite/residential areas to onsite/industrial areas. This sequence and the procedures of work are described in the following sections.

4.1 OFFSITE REMOVAL - 1999

Offsite Removal activities began in the fall of 1999 and included the preparation and implementation of an RA Work Plan (RAWP). This section describes mobilization activities, site preparation, health and safety, and other major RA activities such as excavation, transportation and disposal, confirmation and characterization sampling and analysis, and restoration.

4.1.1 Preparation of Work Plans

The initial task of the RA was to prepare a RAWP for submittal to U.S. EPA. A draft RAWP was submitted to U.S. EPA on September 30, 1999, and approved by U.S. EPA on October 20, 1999. The RAWP included a description of the actions required by the Action Memorandum and a project schedule for implementation of the work. The RAWP described the methods and procedures associated with the performance of the following removal actions:

- Excavation of impacted off-site soil for landfill disposal and restore off-site property;
- Excavation of impacted sediment and bank soil from Fewless Creek, install a culvert from the on-site culvert to Jackson Street, and restore the creek bed and banks; and,
- Stabilization of impacted on-site soil and foundry sand for landfill disposal, and backfill and restore excavated areas.

The RAWP included a summary of the objectives of the removal action and a detailed approach and procedures for implementation. The RAWP also included procedures for verification sampling, backfill sampling, waste characterization, QA/QC procedures, and referenced methodologies described in the U.S. EPA-approved Site Sampling Plan (ENSR, 1998).

The approach and methods of soil stabilization were presented as part of the RAWP as well as the approach for treatability testing to determine the effectiveness of the stabilization agent. A treatability study was also conducted prior to mobilization to determine the optimum mix of the stabilization agent and to confirm the effectiveness of the treatment through laboratory analysis of the treated foundry sand. Foundry sand samples were collected on July 28, 1999 with a Geoprobe™ sampler at the same locations where foundry sand was previously sampled during the EE/CA Support Sampling program (see Figure 2-3 of EE/CA report; ENSR, 1999). From this study, the selected stabilization agent used on-site during soil treatment was chosen.

The RAWP included a Health and Safety Plan (HASP) for protection of on-site personnel, area residents and nearby workers from physical, chemical, and other hazards posed during the removal action. The HASP addressed items such as facility description and operations; potential substances including physical characteristics, exposure routes, and Permissible Exposure Limits/Threshold Limit Values (PELs/TLVs); scope of activities; known hazards and risks associated with activities; personnel responsibilities; designation of work zones; personnel protective equipment and decontamination procedures; site control measures; periodic air and personnel monitoring; training and meeting requirements; and site emergency procedures.

The plan also incorporated applicable EPI and BBC facility safety rules, as well as specific contingency procedures in the event lead-impacted particulates were encountered in the field. Prior to initiating any Site activities, a health and safety orientation class was conducted at the Site for individuals involved in project implementation.

4.1.2 Mobilization and Preparation of Work Areas

Prior to full-scale mobilization to the site, various logistical preparation activities were performed to ensure an efficient startup of field activities. Some of the logistical preparation activities performed prior to full-scale mobilization included:

- Arranging for supplies, materials, and equipment;
- Coordination of efforts with subcontractors;
- Initial coordination with property owners;
- Initiation of property activities including locating utilities, coordination of access agreements, meeting with property owners, and related activities;
- Establishing transportation routes between residential areas, support areas, and the disposal facility;
- Coordination of efforts with local officials, agencies, hospitals, etc., including contingency planning and the identification of names and phone numbers of local first responders;
- Coordination of efforts to identify clean source of topsoil and backfill materials; and
- Other related logistical support activities.

Personnel, equipment, tools and materials were mobilized to the Site in a logical sequence beginning on October 25, 1999. The Site crew consisted of a Site Manager, Site Foreman/Site Safety Officer, field technicians, and heavy equipment operators. During most phases of the removal action work, the Site crew consisted of approximately 6 team members. Project team personnel were 40-hour HAZWOPER trained and had completed baseline medical evaluations prior to project startup.

Equipment necessary to complete each phase of the project was mobilized to the Site. A portable, personnel decontamination station was typically placed near the perimeter of the exclusion zone during excavation activities within each designated area. This station was equipped with rubber wash tubs partially filled with soapy water, potable rinse water, as well as scrub brushes, and a first aid station.

Equipment necessary to complete the project was mobilized to the site as needed. The types of equipment used during the removal action work included:

- Bobcat 331 Mini excavator with rubber tracks
- 70,000 lb. Tracked Excavators
- 24,000 lb. Vibrating Compaction Roller
- Bulldozers
- Bobcat 852 skid steers with street sweeping attachments
- Caterpillar 960 rubber tire wheel loader or equivalent
- Additive Storage Silo
- Frac Tanks (10,000 and 20,000 gallons)
- Single axle dump trucks
- 2,000 gallon Water Truck
- Spectrace 9000 Portable X-Ray Fluorescence (XRF) soil analyzer
- Escort personnel air monitoring pumps
- Mini Random Air Monitor (RAM)
- TSP High Volume Air Samplers
- Utility Trucks
- Supply Trailer
- Decontamination Trailer
- Two-Way Radios
- Survey Equipment

Prior to residential excavation activities, the field crews prepared for excavation by removing obstacles and marking the areas to be excavated with stakes, pin flags, and/or marking paint. In some areas, project personnel determined that fence removal was advantageous to help expedite excavation and restoration activities. The field crew removed lawn ornaments and movable objects to a convenient location beyond the limits of the work zone until restoration activities were completed. Site access was controlled using exclusion zones that were typically demarcated using caution tape and/or construction fence to clearly designate areas of operation. When appropriate, safety cones, barricades, and signs were utilized along streets or alleys that were located adjacent to or included areas scheduled for excavation. A personnel decontamination station was established at a location near the perimeter of the exclusion zone. Additionally, a portable pressure washer unit was stationed near the work zones and used as needed for dust suppression. Air monitoring equipment (personal monitors and mini-Ram) was also calibrated and activated prior to initiating excavation work.

4.1.2.1 Project Kick-Off Meeting

A project kick-off meeting for the 1999 RA activities was conducted at the Site on October 26, 1999. The purpose of the meeting was to discuss field and operations logistics, including safety training, Site security clearance, work-day scheduling, equipment and materials storage, and general Site access with the project team members. Details involving lines of communication, personnel authorities and responsibilities for completion of the removal activities, scope of work and project tasks, activity schedules, cost control, health and safety issues, and Site set-up were reviewed.

Other project implementation details that were discussed included:

- Construction schedule and work sequencing;
- Community relations approach;
- Construction quality control requirements;
- Construction quality assurance procedures and protocols;
- Procedures for processing field decisions;
- Submittal procedures and requirements;
- Handling of record documents;
- Use of the premises;
- Permits and approvals;
- Office, work, and storage areas;
- Equipment deliveries and priorities;
- Safety, first aid, and security;
- Working hours; and
- Property access.

4.1.2.2 Access Agreements

Access agreements were obtained from each affected property owner prior to conducting any removal action. The access agreements were used to document the property owner's consent and perform a detailed inventory of property features and existing (pre-removal) conditions.

4.1.2.3 Pre-Removal Documentation

Still and video photography were utilized to document the pre-removal condition of each property. A *Pre-Removal Property Assessment Form* was also completed for each property, which identified property items to be removed and or stored, property items to remain, and the general pre-removal condition of the property. Specifically, the presence of trees, shrubbery, flower beds, lawn ornaments, outbuildings, decks, and any other items associated with each property were documented. Additionally, the pre-removal condition of paved (asphalt or concrete) sidewalks and driveways, and the condition of house exteriors and foundations were evaluated and noted on the assessment form.

Project personnel reviewed the excavation plans and outlined an approximate completion schedule with each individual property owner. The restoration goal for each property was to restore, as closely as practical and in a timely manner, each property to its pre-removal condition. In many cases, the property owners benefited during the restoration work by replacing old fences and landscape areas with new fencing materials and fresh flowers or shrubs.

4.1.2.4 Property Owner/Resident Notification

Prior to any construction activities on a residential property, the property owner and/or resident was contacted to schedule a personal meeting. At the meeting with the property owner, project team leaders provided a proposed excavation and restoration schedule. Final project sequencing changes were made to accommodate the requests of certain property owners. Prior to commencing excavation activities, a two (2) day notification was also provided. Relocation of residents was not necessary during this project.

4.1.2.5 Administrative and Supply Facilities

The BBC medical building (former Building C-8) located near the northeast portion of the facility was occupied by the project team and used as a temporary Site office during the 1999-2000 Removal Action. The Site office was equipped with phone and fax lines, desks, conference tables, and a restroom. A visitor's sign-in sheet was also maintained inside the Site office. A field support area was also established inside the fenced employee parking area on the eastern portion of the Site. The support area was used to store equipment, a supply trailer, first-aid station, fire extinguishers, and a 500-gallon diesel fuel storage tank equipped with secondary containment.

4.1.2.6 Site Security

Equipment and soil stockpiles were secured inside the former BBC employee parking area, located on the eastern portion of the Site. A six-foot-high chain-linked fence was maintained around most of the removal action areas. Where necessary, caution tape and/or high visibility construction fence was also used to maintain Site security. Appropriate signage to designate exclusion zone areas was properly displayed. Site visitors were required to sign the visitor's sign-in sheet that was kept inside the Site office prior to entering any construction areas. During overnight hours, a BBC security officer was present and monitored the Site.

Residential areas were secured during removal action activities using high-visibility construction fence and/or caution tape.

4.1.2.7 Utilities

Buried utility lines were located prior to initiating excavation work. Project personnel contacted Ohio Utilities Protection Services (OUPS) in advance of any excavation activities to locate off-Site utilities including electric, gas, telephone, cable, water, and sewer. The location of on-site utilities was coordinated with BBC personnel.

During on-site soil removal activities, some utility modifications were necessary. Utility modifications included the relocation of selected utility poles, electrical conduit, and buried storm water piping. On-Site utility modifications were authorized by BBC personnel.

4.1.3 Air Monitoring

Air monitoring was performed throughout removal activities. During the initial two weeks of excavation activities in 1999, a Total Suspended Particulate (TSP) high volume air sampler and a mini-RAM real time ambient dust monitor were utilized to monitor air quality. Both the mini-RAM and TSP sampler were located downwind of excavation activities.

Following the first two weeks of excavation activities, a correlation was developed between TSP airborne lead concentrations and mini-RAM airborne particulate matter concentrations. This correlation was used to develop an appropriate action level for the mini-RAM that ensured neither the National Primary and Secondary Ambient Air Quality Standard for lead nor the National Primary and Secondary Ambient Air Quality Standard for airborne particulate matter was exceeded. The mini-RAM was operated during excavation activities throughout the duration of the project. If the developed action level was exceeded during excavation activities, additional dust suppression and engineering controls were instituted.

The high volume TSP air samples were submitted for laboratory analysis in accordance with 40 CFR Part 50, Appendix G, as outlined in the approved RAWP. A baseline evaluation was developed to identify background levels of airborne particulate prior to removal activities. High-volume TSP air samples were conducted on a 24-hour turnaround using the aforementioned analytical method and Level 4 DQOs. Ambient air quality was monitored for particulate levels and wind speed and wind direction was monitored for employee health and safety purposes. This level of QC involved daily calibration of instruments and multiple reading on a single sample.

The mini-RAM was used to measure airborne particulate matter. The National Primary and Secondary Ambient Air Quality Standards called for particulate matter to be measured as PM-10 size matter. The mini-RAM had no sizing capabilities and, therefore, measured total airborne particulate matter. The use of the mini-RAM was therefore a conservative approach to measuring airborne particulate matter because it assumed airborne particulate matter to be smaller than 10 microns. During the RA, the National Primary and Secondary Ambient Air Quality Standard for particulate matter was 150 micrograms per cubic meter of air.

The personal/area low volume air samplers were used to measure airborne lead levels as it pertained to OSHA. During the RA in 1999, the action level for airborne lead was 30 micrograms per cubic meter of air and the permissible exposure limit was 50 micrograms per cubic meter of air. The personal/area low volume air samples were submitted for laboratory analysis utilizing NIOSH Analytical Method 7082. The Personal Air Sampling determined whether worker exposure was in compliance with provision of 29 CFR 1962.62(d)(3)(iii) and (d)(3)(iv). The OSHA Lead Standard established an action level of 30 microgram (µg) of lead per cubic meter (m^3) of air. Personal air sampling monitoring included three (3) samples per employee in the excavation zone.

4.1.4 Additional Investigation Areas

In accordance with the approved RAWP, additional investigation sampling and analysis was performed concurrent with the removal action activities at the Site in 1999. These areas were previously identified by the U.S. EPA as areas where data gaps may have existed. The additional sampling was performed to evaluate lead concentrations in shallow soil at the Site locations listed below:

- A diked area on site under the "B" baghouse;
- Unpaved areas adjacent to the on-site medical/training building;
- The small, on-site gravel employee parking lot on the east side of the BBC site; and,
- The off-site grassy area northeast of the facility between the facility fence and the Linwood Trailer Court access road/parking area.

Soil samples were collected from soil borings at a total of 11 locations. The soil borings were advanced using a stainless steel hand auger. Samples were collected from 4- to 6-inch intervals to a depth of 18 inches below the ground surface. Soil samples were collected in accordance with the applicable portions of Section 5.2.2 of the approved EE/CA Site Sampling Plan (ENSR, 1998).

In addition, shallow subsurface soil samples were collected immediately southeast of the site on property owned by Keith Lantz on Jackson Street. Soil samples were collected at a depth of 3 feet below the ground surface using a hand auger and analyzed for lead using a Spectrace 9000 x-ray fluorescence (XRF) analyzer. Sample locations were consistent with existing borings R-15, R-16, and R-17 sampled during the EE/CA investigation.

The samples were described and logged by a soil technician using the Unified Soil Classification System, and split into two portions. Half of each sample was deposited in a laboratory-supplied sample jar and placed in an iced cooler. The other half was deposited into a ziplock bag, sealed, and set aside for XRF field screening. Based upon visual observations and XRF analyses, select samples were submitted to Quanterra (later known as STL, and now Test America) laboratories for analysis of total lead (SW-846 Method 6010).

As discussed above, a portion of each sample was split for on-site ex-situ XRF analysis and potential off-site laboratory analysis. Samples for total lead analysis not initially selected for off-site laboratory analysis were submitted to the laboratory under chain-of-custody procedures and archived for potential future analysis.

Soil samples were collected from each shallow boring in accordance with the following general approach. The approach was as follows:

Depth Below Ground Surface	Approach
0 to 4 inches	Split sample, screen with XRF, and submit to off-site laboratory for analysis
6 to 12 inches	Split sample, screen with XRF, and submit to off-site laboratory for archive
12 to 18 inches	Split sample, screen with XRF (if necessary), and submit to off-site laboratory for archive

As indicated, soil samples collected from intervals below one foot were only screened with the XRF for the presence of target metals if soil samples from the shallower depths indicated the presence of elevated concentrations of target metals. The actual laboratory analyses performed on each sample were dependent on the results of the field screening. Environmental sampling performed during this investigation included the collection of QA/QC samples such as daily equipment blanks, blind duplicate samples (1 for every 10 samples), and matrix spike/matrix spike duplicate (MS/MSD) samples (1 for every 20 samples). Level 4 DQOs and CLP laboratory protocol were followed. Per the request of Matt Ohl (U.S. EPA), copies of original laboratory data from 1999 and 2000 were submitted to the attention of Todd Wilson, U.S. Army Corps of Engineers (USACE), Omaha District, in a transmittal dated June 20, 2001.

Upon completion, borings were backfilled with granular bentonite to ground surface. Downhole equipment was transported and cleaned at a designated decontamination area. Sampling equipment was decontaminated between each sample using an Alconox wash, a potable water rinse, a nitric acid rinse, and a deionized water rinse. Decontamination fluids were containerized and handled with the other decontamination fluids generated during removal activities.

4.1.5 Excavation Procedures

Offsite excavation was performed at 16 general locations designated by the letters A through P. These areas were identified during the EE/CA as areas containing total lead concentrations greater than 400 mg/kg.

Off-site surface soils were excavated from the areas designated on Figure 3. These areas included soils identified through EE/CA and additional sampling activities having total lead concentrations in excess of 400 mg/kg. Most of the residential areas were excavated using a Bobcat loader and a mini-excavator due to the limited depths required (approximately 6 inches) and available space. Some hand excavation was also performed immediately adjacent to mature trees, decks, and building perimeters. Larger open areas such as alleys and parking areas were excavated using the 70,000 lb. tracked-excavator. Soils generally consisted of a layer of sod and topsoil (2 to 3 inches) followed by silty clay subsurface.

Two single-axle dump trucks were typically used to transport the excavated material to the on-Site stockpile area. Proper soil handling techniques were used during soil loading, transportation, and unloading procedures to prevent cross-contamination of non-impacted areas. For example, in addition to soil wetting methods used for dust suppression during excavation and loading, the dump trucks were equipped with fabric tarps to cover the soil during transport to the stockpile area. Plastic sheeting was also placed below the dump trucks during soil loading to collect spillage. The rubber-tire loader was primarily used to consolidate the excavated soil into manageable stockpiles on designated areas at the facility (employee parking area).

The XRF analyzer was used as a screening instrument to determine total lead concentrations in soil in the field. Although the XRF analyzer was calibrated daily using site-specific soil standards of known lead concentrations, a conservative approach was used in the field to guide the removal of any additional areas that contained total lead concentrations above the 400 mg/kg residential clean-up goal. The XRF was portable and able to measure total lead concentrations (in-situ) in approximately 60 seconds, thus increasing field efficiency and maximizing excavation efforts.

Field measurements were made to determine the volume of each area both before and after excavation work was completed. These measurements were evaluated on a daily basis to track project costs. In most cases, the perimeter boundaries of the off-site areas were not significantly increased, excluding off-site Area C. The southeast portion of off-site Area C was extended to the east to include an additional 1,000-square-foot area. The excavation depths in some of the off-site areas, however, were increased by approximately 6 inches in portions of Areas E, H, I, J, and M.

As indicated above, hand excavation was required in areas including, but not be limited to, foundations, utilities, trees, and shrubs. Reasonable efforts were made to save mature trees (greater than 2-inch trunk diameter) and other smaller trees if requested by property owners.

Excavation procedures below selected tree canopies were performed until the feeder root systems were encountered (typically 2-4 inches in depth). In most cases, XRF data showed that lead levels were below 400 mg/kg and additional excavation was not necessary. However, some hand excavation was performed within the feeder root system of certain trees, particularly in off-site Area C.

Other "special" excavation areas were directed by the following guidelines:

4.1.5.1 Storage Sheds/Outbuildings

Two storage sheds, located within areas scheduled for excavation that were not secured to permanent foundations, were encountered in off-site Areas B and C. Both storage sheds were moved to convenient locations outside each exclusion zone until restoration activities were completed. The storage shed in Area B was damaged during restoration work and was subsequently replaced with a new shed.

No other storage sheds/outbuildings were encountered.

4.1.5.2 Planting Beds

Planting beds were encountered in many of the off-site areas including Areas C, F, K, L, and N. In most cases, the property owners did not object to the removal of existing planting beds during excavation activities and either agreed to replace the beds themselves or this was performed by the project team as part of the restoration effort. However, in Area F the existing planting bed was left undisturbed after XRF screening results and analytical data confirmed that total lead concentrations of the soil below the surface mulch layer were well below 400 mg/kg.

4.1.5.3 Foundations and Other Structures

Excavation activities around foundations, porches, stairs and other structures were performed by hand in an effort not to compromise their integrity. The off-site residential areas to the north of the facility consisted of mobile homes that were constructed above concrete slabs. Structures to the south and east of the facility (i.e., Areas E, F, L, and N) consisted of masonry block footers or poured basement walls that extended well below the excavation depths. Beneath trailer home extensions, attached porches, and/or stairs generally consisted of soil. Following completion of excavation work in these areas, XRF screening and analytical testing was performed to evaluate soil conditions beneath these structures. Total lead concentrations were found to be below the residential clean-up goal of 400 mg/kg. Soil beneath concrete sidewalks and asphalt surfaces were not removed.

4.1.6 Decontamination

Decontamination of excavation equipment was performed regularly to prevent tracking lead impacted soil onto designated clean areas. Decontamination methods varied depending upon the type of equipment to be cleaned and the extent of residual soil present. For example, during removal activities of off-site areas, the tracked excavator and Bobcat skid steers were typically cleaned prior to leaving the exclusion zone areas using shovels and brushes (dry decontamination methods). These areas generally involved shallow excavation work and were performed during dry conditions. More aggressive decontamination procedures were required during Fewless Creek and on-site area excavation work due to the types of material encountered (very moist creek sediment) and depths. In these instances, a portable pressure washer was used in conjunction with brushes and shovels to remove residual material from the equipment. Decontamination wastewater was temporarily containerized as it was generated and either added to the stockpiled soil or pumped into a Frac Tank (depending on the volume). Waste material generated during decontamination procedures (i.e., wash water, PPE, etc.) was collected and disposed off-site with the impacted soil.

Equipment decontamination procedures involved the use of reusable equipment such as a stainless-steel hand trowel, hand auger, mixing bowl, and spoon. Decontamination methodology was performed in accordance with the approved EE/CA Site Sampling Plan. Four portable spray bottles were filled with solutions of an Alconox detergent wash, a potable water rinse, a 10 percent nitric acid rinse, and a deionized water rinse. As needed, solid particles were removed by using a hand-held brush and rinsing with tap water to eliminate gross contamination over a dedicated 5-gallon bucket. Decontamination rinse water was periodically added to the stockpile of excavated soil. Decontaminated equipment was dried using paper towels and stored in a clean zip-lock bag or covered with tin foil.

4.1.7 Stockpiling Excavated Soils

Soils excavated from the residential areas were transported to a designated on-Site stockpile location using single-axle dump trucks. The stockpile area was located within the fenced employee parking area on the eastern portion of the Site. A dedicated rubber-tire loader was used to consolidate the excavated material into approximate 300-ton stockpiles to facilitate waste characterization and off-site disposal. The stockpile area was constructed using earthen perimeter berms and a bottom layer of 6-mil plastic sheeting. At the conclusion of each work day, the stockpiles were covered with 6-mil plastic and secured using 50-lb. sand bags and rope.

4.1.8 Verification Sampling and Analysis

At the conclusion of excavation and field screening activities (using XRF), verification sampling and analysis was conducted to verify compliance with performance standards. Verification samples were collected randomly from excavation sidewall and bottom locations and submitted for off-Site laboratory analysis. The samples were collected and analyzed per the previously approved EE/CA Site Sampling Plan. A stainless-steel hand trowel was used to collect a representative sample from the excavation area and immediately transferred to a laboratory-supplied sample jar. The total number of samples collected was based on the size of the excavation area.

Additional verification samples were added to each area during over-excavation activities that exceeded 1,000 ft^2 in size and/or any re-sampled locations. Due to over-excavation activities along the southeast portion of Area C, one additional verification sample was collected in this area. Seven additional verification samples were also collected and analyzed as a result of re-sampled locations. Verification re-sampling was performed after additional excavation was completed in areas where a post-excavation sample exceeded the remediation goal of 400 mg/kg. Re-sample locations were collected from Areas C, F, I, and N. Two additional verification samples were collected from Area N. A total of 60 verification samples (excluding QA/QC samples) were collected from the off-site areas.

Verification samples were submitted to Quanterra (later known as STL, and presently known as Test America) in North Canton, Ohio for analysis of total lead by U.S. EPA Method 6010. The analytical results were generally completed within a 24-hour period in order to initiate backfill and complete residential restoration work in a timely manner. During instances where a critical excavation located within a road or alley would have remained open over a weekend, the project team initiated backfilling in advance of receiving verification results in the interest of public health and safety. Because of the correlation between XRF and laboratory results, this risk of having to re-excavate a backfilled area due a failed verification sample was significantly reduced.

Various types of field QA/QC samples were collected during verification sampling to verify that the sample collection and handling process did not affected sample quality. Field QA/QC samples consisted of equipment blanks, duplicates and matrix spike/matrix spike duplicates (MS/MSD). Equipment blanks were collected during each day that sampling was performed and consisted of deionized rinse water that was rinsed over a decontaminated soil sampler. Duplicate samples were collected at a rate of approximately 10 percent of the total number of samples collected. Similarly, MS/MSD samples were collected at a rate of approximately 5percent of the total number of samples collected.

Quanterra's internal QC program provides for the use of standards, laboratory blanks, duplicates and spiked samples for calibration and identification of potential matrix interferences. In addition to standard deliverable items such as sample number and dates, analytical methods, analyst's initials, and surrogate recoveries, the laboratory reports included the following:

- Daily continuing calibration report;
- Continuing calibration verification report;

- Blank report;
- LCS laboratory control standard results; and
- MS/MSD report.

Per the request of Matt Ohl (U.S. EPA), copies of original laboratory data from 1999 and 2000 were submitted to the attention of Todd Wilson, USACE, Omaha District, in a transmittal dated June 20, 2001.

4.1.9 Characterization Sampling and Analysis

Excavated soil was characterized by collecting one composite soil sample from every approximate 600 tons of stockpiled soil. Each composite sample was composed of six aliquots of soil collected from six equally-spaced intervals in the stockpile and from approximately one foot within the stockpile. Each composite sample was submitted under chain-of-custody procedures to Quanterra (now Test America) and analyzed for hazardous characteristics for lead per the toxicity characteristic leaching procedures (TCLP) by U.S. EPA SW-846 Method 1311/6010. Each sample was also analyzed by paint filter testing of liquid content per U.S. EPA SW-846 Method 9095.

4.1.10 Transportation and Disposal

Upon receipt of analytical data indicating that the stockpiled material was not toxic for lead and did not have free liquids, the material was loaded into trucks and transported under manifest to Republic Waste's Carlton Farms Landfill in Sumter Township, Michigan.

4.1.11 Backfilling and Restoration

Backfill activities were completed in the off-site areas after verification samples demonstrated that the remaining soil in the excavation contained total lead concentrations below 400 mg/kg. Clean backfill was used to restore each excavation area and consisted of either topsoil or gravel.

Imported topsoil was used to restore off-site areas that originally consisted of former grass areas. The topsoil originated from Seaway Sand & Stone, Inc., located in Swanton, Ohio and was temporarily stockpiled in an area north off-site Area E. Due to the shallow excavation depths (generally 6 inches), the topsoil was placed using a single lift. Sod was later placed above the topsoil to complete restoration. Off-site restoration of Areas A, B, C, D, F, K, L, and N consisted of mostly topsoil and sod restoration. A total of 2,200 yd^2 of sod were installed in these off-site residential areas. A 2,000-gallon water truck equipped with hose and spray attachments was used periodically to stimulate root activity prior to the winter season.

Three types of gravel backfill were used to restore former off-site road areas and included yard stone backfill, 411 gravel, and 6/57 gravel. Each source of gravel was imported from Stoneco, Inc., a local quarry in Maumee, Ohio. Yard stone backfill contained a moderate to high percentage of fines mixed with the limestone gravel and was mainly used as a sub-grade fill. Conversely, 411 gravel and 6/57 gravel consisted of mostly stone (few fines present) and was used during final grading. Stockpiles of imported gravel were staged in a non-impacted area south of Fewless Creek, between off-site Areas I and O. Off-site Areas E, G, H, I, J, M, and O consisted of mostly gravel restoration. Off-site Area G was originally a grassy area (south of Fewless Creek); however, the property owner requested that the area be restored with gravel.

Single-axle dump trucks were used to transport stockpiles of either topsoil or gravel into each off-site restoration area. Bobcat skid loaders, shovels, rakes, and a vibrating roller were used during grading work. Equipment used during backfill activities was properly decontaminated.

Fences and other structures removed during Site activities were replaced at the conclusion of backfill work. New fencing was installed in off-site Areas C, D, K, and N by a local fencing contractor (B&W Fencing). In off-site Area C, a portion of the original chain-link fence was re-used along the north wall of the BBC Medical Building (Buildings C-8 and C-9). Otherwise, new fencing material was installed and consisted of either chain-link, split rail, or wooden privacy fence.

In off-site Area C, the storage shed located near the northeast corner of the Building C-8 was replaced. Additionally, some of the metal panels found along the base of the residential trailer located at Non-Responsive were repaired during the restoration effort. In off-site Area B, a new storage shed was purchased and replaced near the northeast corner of 304 Van Buren Street.

4.1.12 Post-Removal Site Documentation and Inspection

Following Site restoration activities, each site was video-taped and photographed again to document final post-removal conditions. A post-removal inspection was conducted with the property owner/resident after the completion of each property or group of properties. Each property owner signed the checklist form which acknowledged that successful restoration was completed, except for Areas G and H.

In the cases of Areas G and H, successful restoration was not achieved, in part, because of the Fewless Creek improvement work which included the addition of a drainage swale located along the northern edge of both areas. The drainage swale was installed within the original banks of the Fewless Creek and provided surface drainage towards a drop culvert that drained into the creek.

4.2 FEWLESS CREEK - 1999

Removal action associated with Fewless Creek involved the excavation and disposal of sediments and bank soils as well as the installation of a 78-inch diameter corrugated metal pipe between the facility headwall to Jackson Street. Prior to initiating field work, a "Permit to Reconstruct or Alter a Ditch, Drain, or Watercourse" was submitted and approved by the Fulton County Engineer's Office. This permit included engineering drawings of pre-construction site conditions, proposed structures, and construction details. Additionally, calculations were performed to verify the hydraulic capacity of the proposed culvert and associated drainage structures.

The Village of Delta Administration Office was also contacted during the permitting process to incorporate any local modifications necessary.

No federal permits were required through the U.S. Army Corps of Engineers (COE) office. This project was exempt through the provisions of Nationwide Permit No. 38 - Cleanup of Hazardous and Toxic Waste.

Areas adjacent to Fewless Creek were grubbed to remove trees and other vegetation prior to initiating excavation work. Chain-saws and a wood chipper were used during grubbing activities. The stockpile of wood chips was removed from the site and disposed at a Republic Waste's Carlton Farms landfill. A portion of chain-link fence (4-foot) was also removed along the southern extent of on-site Area C, and a portion of on-site Area A. Initially, the fence was to be recycled with BBC's metal recycling waste program; however, several areas of the fence were filled with woody vines that could not be segregated. As a result, the fence was disposed off-site with the excavated soil.

Creek de-watering techniques were used prior to initiating excavation work. Sandbags and earthen dams were used to temporarily restrict creek flow at the facility headwall and east of Jackson Street. Trash pumps were also used as needed to divert water around the excavation areas. Additionally, approximately 100 tons of calcement (calcium-based drying agent) was mixed with the bottom creek sediment to eliminate residual free liquids prior to excavating and stockpiling on-site.

Excavation of bank soil and sediments began at the facility headwall (west portion of Fewless Creek) and progressed in an easterly fashion (i.e., downstream). The tracked excavator removed the impacted bank soil and sediment from the creek onto single-axle dump trucks. The dump trucks transported individual loads of the material on-Site for temporary staging in a designated stockpile area. Similar to off-site material staging, a rubber-tire front end loader was used to consolidate the sediment and soil into appropriately-sized (approximately 300 ton) stockpiles.

Initially, the excavation depth was limited to approximately 12 inches along the banks and creek bottom. However, total lead concentrations measured in the field using the XRF analyzer exceeded the 200 mg/kg clean-up level and additional removal was necessary. The total excavation depth between Jackson Street and the facility headwall ranged from approximately 2.5 to 5.0 feet in depth below the ground surface. Bank soils (north and south) along the western portion of Fewless Creek were removed to an average distance of approximately 3.5 feet from their original location. East of Jackson Street, the excavation depth was limited to approximately 1.5 feet in depth. In general, the depth of impacted sediment became significantly shallower with distance away from the facility (downstream).

Based on post-excavation measurements and soil disposal weights received from the landfill, approximately 1,300 tons of impacted sediment and bank soil was removed from areas of Fewless Creek.

Excavated material was loaded onto single-axle dump trucks, using the tracked excavator, and transported on-site and temporarily stockpiled within poly-lined and bermed areas. The rubber-tire loader was dedicated to the stockpile area and consolidated material unloaded from the dump trucks. Each stockpile contained approximately 300 tons of material, which was covered and secured at night using 6-mil plastic sheeting and sandbags. Stockpile testing and characterization is discussed in Section 4.3.4.3.

4.2.1 Verification Sampling

Upon completion of excavation activities, post-excavation sampling and analysis was conducted to verify compliance with performance standards. Verification samples were collected from the bank sidewalls and bottom on 100-foot intervals along the length of the creek. A total of 12 post-excavation samples were collected from Fewless Creek using a stainless-steel hand trowel. Of these, eight bottom and four bank samples were collected. The samples were submitted to Quanterra (now Test America) in North Canton, Ohio for analysis of total lead by U.S. EPA Method 6010.

Analytical results were generally received within 24-hours of sample collection in order to expedite backfill and restoration of the creek. Total lead concentrations from verification samples were well below the ecological clean-up standard (200 mg/kg) and ranged from 8.1 mg/kg to 17.3 mg/kg. Per the request of Matt Ohl (U.S. EPA), copies of the original laboratory data from 1999 and 2000 were submitted to the attention of Todd Wilson, USACE, Omaha District, in a transmittal dated June 20, 2001.

4.2.2 Restoration of Creek Bed and Bank East of Jackson Street

Upon receipt of verification sampling results, portions of Fewless Creek located to the east Jackson Street were restored using sandy backfill. Sandy backfill was compacted along the creek bottom using the tracked excavator and graded to closely match the original creek bottom. Several tons of rip-rap gravel were placed on the creek bank, immediately south of the 66-inch diameter culvert that daylights on the east side of Jackson Street. A portion of the creek bank at this location was excavated during sediment removal activities.

Some minor sod repair was needed to the east of Jackson Street along the north portion of the creek. During sediment excavation and creek restoration work, heavy equipment was positioned in areas adjacent to the north bank and caused some minor sod damage. This area was revegetated as part of the restoration effort.

4.2.3 Restoration of Fewless Creek Bed/Bank and Installation of a CMP Culvert

Restoration of Fewless Creek west of Jackson Street included the installation of a 78-inch diameter corrugated metal pipe (CMP). The diameter of the culvert was determined based on the hydraulic evaluation of streamflow conditions (i.e., 100-year storm) and was consistent with the size of the existing concrete culvert beneath the site. Prior to CMP installation, the creek bed was partially backfilled with sand. Survey equipment and grading stakes were used to determine the amount of sandy backfill needed in order to maintain a gradual slope (approximately 3percent) from the existing headwall to Jackson Street. Grading stakes were installed along the creek bottom every 20 feet.

After the creek bottom was properly compacted and graded, individual sections of CMP were lowered into the creek bed using the tracked excavator and slings. Each section of CMP was 20 feet in length. Overlapping metals bands were used to connect the individual sections of CMP together once the pipe sections were in-place. The bands were secured by tightening threaded bolts located on each side. Because the existing culvert below Jackson Street was 66 inches in diameter, one of the CMP sections had to be fabricated at one end to reduce from 78 inches to 66 inches in diameter. This was accomplished by fitting a short section of 66-inch CMP to the end of a 78-inch CMP so that the pipe bottoms matched. The gap between the two pipe sections was filled using a specially cut piece of steel that was welded to both CMP sections.

CMP installation began at the Jackson Street culvert and progressed in an easterly fashion. Several yards of concrete were used to connect the CMP to the existing culverts at Jackson Street and at the facility headwall. Temporary concrete forms were constructed at these locations using plywood and boards. Similarly, the six existing storm lines that previously drained into Fewless Creek, as well as two 18-inch diameter drop culverts (with steel grate covers) that were installed near Jackson Street to collected surface water from areas to the north and south of the creek, were piped into the 78-inch CMP. At each location, an access hole was cut into the CMP and enough new piping material was added to each drain line to adequately enter the main CMP.

Sandy backfill and yard stone were then used to backfill between the outside perimeter of the CMP and the creek bank. Above the CMP, approximately 6 inches of topsoil was installed from the south property fence of BBC to Jackson Street. Along both sides of the pipe (north and south sides), within the original banks of the former creek, two drainage swales were installed to collect surface water and drain into the 18-inch drop culverts. The area above the CMP and within the drainage swales was revegetated as part of the restoration. As a precautionary measure, warning posts were also installed along south side of the CMP to keep vehicles from driving over the pipe. Inside the property fence, BBC requested that the area above the CMP be restored using gravel.

4.3 ON-SITE REMOVAL - 2000

On-Site soil removal began in 2000. The objective of the on-site soils/foundry sand removal action was to remove the foundry sand and soils exceeding the designated residential soil cleanup level of 400 mg/kg total lead. The objective changed late in the project (in June 2004) when U.S. EPA, EPI, and BBC agreed that the on-site soils/foundry sand containing greater than 400 mg/kg, but less than 1,536 mg/kg, total lead could remain in place provided a restriction is placed on the property deed. Removal action activities conducted that achieved these objectives are described below.

The on-site work areas consisted of the majority of the gravel parking area located at the east and southeast portion of the site. These areas were initially designated as on-site Areas A through D, based on findings reported in the EE/CA investigation. Prior to initiating excavation activities, field crews prepared the site by delineating the on-site areas, confirmed locations of buried utilities, relocating heavy equipment and supplies as needed, and establishing a restricted work zone around the perimeter of these areas using caution tape and/or construction fence. Fences located in these areas were previously removed during stockpiling of off-site soil and Fewless Creek sediment within earthen bermed areas. Storm water drains located within these areas were removed during excavation activities and later replaced as part of on-site restoration work.

4.3.1 Excavation

Removal action activities at the Site have included excavation, stabilization, and disposal of contaminated soil, debris, and foundry sand material located in the subsurface of unpaved areas on the eastern portion of the Site. These areas were identified as on-site Areas A, B, C, and D in the approved Removal Action Work Plan (RAWP) dated October 29, 1999.

Prior to industrial area excavation, field crews prepared the area by removing fencing, vegetation, and debris and marking the areas to be excavated. Fences were left in place where possible; however, fences were removed when excavation crews determine that removal would expedite excavation and backfill operations. Temporary erosion and sedimentation control measures were established to control potential run-on and run-off water and dust control measures were also implemented to minimize impacts to adjacent areas.

Prior to initiating stabilization and excavation activities in the buried foundry sand area, the existing stormwater culverts were removed/plugged, the storm drains around the foundry sand fill area were rerouted, and the new culverts were connected to the new Fewless Creek culvert.

In addition, the following site control activities were performed prior to excavation and stabilization/chemical fixation operations:

- Established site inspection protocol and documentation requirements;
- Secured the impacted work areas to control site entry and exit;
- Implemented sign-in log to document entry of visitors and personnel on site; and
- Posted signs to control and restrict site access.

Work zones were established around the perimeter of the facility. Tape and signs were installed to identify the Exclusion, Contamination Reduction, and Decontamination Zones. Level C Personal Protective Equipment (PPE) was required to enter the Exclusion Zone. Access to the Exclusion Zones was controlled.

On-site surface soils and buried foundry sand areas were excavated until the residential cleanup standard of 400 mg/kg was achieved. Excavation work was completed using up to two 70,000-lb tracked excavators and a rubber tire loader used to transfer material into temporary stockpiles. The extent of on-site excavation work was guided by the XRF and laboratory verification results.

Initially, on-site Areas B, C, and D were characterized as containing mostly lead-impacted soil above the residential cleanup standard to a depth of approximately 18 inches. Unlike on-site Area A, which was previously defined as the buried foundry sand area, soil stabilization prior to off-site disposal was not anticipated in these areas. On-site excavation work began at the northern portion of Area B and progressed in a southerly manner. Similar to excavation work completed in off-site residential areas and Fewless Creek, material was initially stockpiled on-site (300 ton stockpiles) and sampled for TCLP lead and Paint Filter analysis. Laboratory results reported that the material excavated and stockpiled from Area B contained TCLP lead concentrations that exceeded the action level of 5.0 milligrams per liter (mg/L). At that point, only the northern and western portions of Area B had been removed and the volume of soil excavated was significantly greater than expected due over-excavation needed in these areas.

The type of material removed from Area B consisted of a silty clay fill that was commonly co-mingled with various sizes of concrete debris and other miscellaneous rubble. Concrete debris ranged in size from several inches to several feet in diameter. Additionally, portions of unconsolidated fill were entrained with isolated pockets of water that became mixed with the soil during excavation work to create a sticky, silty clay. These conditions were significantly different from that which was used during the foundry sand treatability study which assumed the use of a pugmill mixing chamber. Additionally, completion of on-site removal action was estimated to extend well into the winter months due to the additional material now anticipated. Prolonged downtime and increased equipment maintenance was necessary.

4.3.2 Stockpiling Excavated Soils

Soil/sediment excavated from the residential, Fewless Creek, and industrial areas was staged on-Site. Various controls were utilized to manage the staging area. The staging area was graded, as necessary, to level the surface and remove any surficial debris. Initially, 6-mil reinforced polyethylene was placed on the ground in the area designated for stockpiling purposes. Prior to stockpiling material on the liner, a layer of clean material was placed on the liner to serve as a visible indicator of where the excavated materials begin/end and to protect the liner during addition/removal of materials. Material excavated over the course of the project was placed onto the polyethylene and staged soil piles were covered with polyethylene sheeting at the end of the day's activities or prior to inclement weather to minimize the generation of leachate. This procedure protected the stockpile from wind and water erosion. Storm water runoff controls was also implemented and included earthen berms and silt fence/hay bail controls. A containment berm was constructed around the perimeter of the staging area to prevent any surface water run-off and provide a means of collecting any water that may have leached through the stockpiled material. The poly liner extended over the outside of the berms. Collected wastewater was used as an additive in the treatment process.

4.3.3 Verification Sampling and Analysis

As discussed above, final verification samples along the perimeter of the excavation were collected outside the excavation hole utilizing long-reach sampling equipment. Post-excavation sampling and analysis was conducted to verify compliance with performance standards. Verification samples were collected after excavation and submitted for analysis in accordance with applicable portions of Section 5.6.2 in the approved EE/CA Site Sampling Plan and Section 4.4.4 of the approved RAWP. Verification soil samples were collected every 50 linear feet along the excavation sidewalls and floor. Accordingly, based on the estimated size of the on-site excavation areas, one to two verification samples were collected from each side wall and from two locations within the base of the excavation (i.e., total of 8 samples). Samples were submitted to Quanterra (now Test America) in North Canton, Ohio for analysis of total lead by U.S. EPA Method 6010. In addition, QA/QC procedures including chain-of-custody procedures and sampling equipment decontamination procedures were performed as described in Section 4.4.4 of the approved RAWP. Per the request of Matt Ohl (U.S. EPA), copies of the original laboratory data from 1999 and 2000 were submitted to the attention of Todd Wilson, USACE, Omaha District, in a transmittal dated June 20, 2001.

4.3.4 Soil Stabilization Activities

Materials that exhibit hazardous characteristics based on laboratory results from representative samples submitted from those areas were treated/stabilized for disposal as non-hazardous waste. Due to the nature of the material, a portable mixing chamber (pugmill) could not be utilized to perform ex-situ stabilization. Instead, ex-situ stabilization was performed in mixing cells constructed with concrete jersey barriers.

The stabilization objective for the excavated material was intended to satisfy both the Phase IV Land Disposal Restriction (LDR) treatment standards for lead-contaminated soils (foundry sand

and excavated material) and the RCRA criteria for nonhazardous waste. If necessary, excavated material was treated to below 5.0 mg/L TCLP lead to both meet the Phase IV LDRs and the RCRA characteristic criteria for lead for disposal as nonhazardous treated material at a Subtitle D landfill. In addition, treated material was also characterized to demonstrate that LDRs for site constituents that have a Universal Treatment Standard (UTS) have been achieved.

Contaminated materials was removed and transported to the treatment area by conventional construction equipment and staged separately from non-hazardous materials for stabilization. Stabilization of the material was achieved using ENTACT's patented phosphate-based additive or phosphate additive blend. The treatment achieved the required performance standard and no longer exhibited the toxicity characteristic for lead using the TCLP. The lead-contaminated material was blended and loaded into the treatment unit to ensure a uniform mix of contaminated media. Dust suppression systems were utilized during excavation, loading, transport, and treatment to limit airborne emissions. Water management practices were incorporated during excavation procedures to control water run-off.

Near completion of the on-site treatment of the material, the berm material surrounding the staging area was tested for total lead. If necessary, the material was treated on-site to render the soils nonhazardous (< 5.0 mg/L TCLP lead) and shipped off-site for disposal at a RCRA Subtitle D facility. Following removal of the bermed area and underlying impacted soils, soils underlying the berm were field-screened for total lead using the XRF.

Confirmation samples (one per 300 tons) of the treated foundry sand were collected to document the effectiveness of the stabilization. These samples were properly collected, prepared, documented, and submitted for laboratory analysis as discussed in Section 14.13.1 of the approved RAWP. Laboratory confirmation that the TCLP lead results are below 5.0 mg/L for the treated foundry sand were received before the treated material was loaded for transport to the off-site solid waste landfill. Once stabilization had been completed and treatment standards demonstrated, the stabilized materials were transported and disposed off-site at Carlton Farms landfill as non-hazardous.

Treatment activities were performed with proprietary treatment additives and in accordance with applicable CERCLA regulations. The narrative below describes in greater detail the treatment process and its impact on the nature of lead mobility in soils.

4.3.4.1 Behavior of Lead in Soils

Lead is the constituent of primary concern for this removal action. Lead is generally not very mobile in the environment, and tends to remain relatively close to its point of initial deposition. Generally, soils tend to retain lead in the upper few centimeters. The capacity of soil to adsorb lead increases with increasing pH, cation exchange capacity, organic carbon, soil/water Eh (redox potential), and phosphate levels. Lead exhibits a high degree of adsorption on clay-rich soil. Lead compounds can also be adsorbed onto hydrous oxides of iron and manganese and thus be immobilized in salts containing two (2) or more cations.

In order for chemical fixation/stabilization to be successful, the various forms of lead salts, especially lead oxide, need to be converted to compounds that are particularly insoluble under the normal pH range found in soils. Lead is capable of forming the following three (3) low solubility orthophosphate salts:

- $Pb_3(PO_4)_2$,
- Pb_2HPO_4, and
- $Pb(H_2PO_4)_2$.

4.3.4.2 Treatment Technology Description

The stabilization process, sometimes referred to as immobilization or fixation, uses additives to chemically immobilize the hazardous constituents of a contaminated material by combining the additives, and lead-bearing matrix within a mixing device. Additive reagents for use in the stabilization of lead-contaminated materials include Portland Cement, calcium oxide, calcium carbonate, fly ash, and proprietary additives. Other investigators have documented successful stabilization of lead using combinations of the following compounds: magnesium oxide, magnesium hydroxide, reactive calcium carbonates, reactive magnesium carbonates, and boric acid.

ENTACT had developed a proprietary list of additives for stabilizing waste containing lead and other heavy metals by including phosphoric acid, monocalcium phosphate, monoammonium phosphate, and diammonium phosphate either alone or in combination with Portland Cement.

The listed ENTACT patented compounds provided the necessary environment for successful lead stabilization. The first component was a phosphate ion that reacted with metals such as lead to form a salt which is insoluble under normal environmental conditions. The second component was the phosphoric acid buffer system that provides stability to the treated waste mixture under minor environmental changes (e.g., acid rain).

4.3.4.3 Characterization Sampling and Analysis

Excavated and stabilized materials were segregated and sampled by collecting one composite sample from every 300 tons of stabilized material. Each composite sample was analyzed for hazardous and other disposal characteristics (i.e., TCLP, paint filter test) required by the disposal facility by U.S. EPA SW-846 Methods 1311/6010 and 9095, respectively. A three-day turnaround time for sample analyses was used.

4.3.4.4 Transportation and Disposal of Non-Hazardous Waste

The disposal facility coordinated transportation services in conjunction with the disposal of the different waste streams. The wastes generated during the 1999 and 2000 RA were disposed of at the Republic Waste - Carlton Farms Facility located in Sumter Township, Michigan.

4.3.4.5 Property Backfilling and Restoration

All excavated areas were backfilled in 12-inch loose lifts with verified clean fill utilizing a skid steer and a dozer. Backfilled areas were compacted with a smooth drum vibratory roller and graded to original conditions while allowing for proper drainage. Areas that were previously composed of gravel were restored to their pre-excavation condition. Fences and other site improvements were replaced to their original conditions or better. Any fences or other site improvements removed during the on-site work were replaced as new.

4.4 SITEWIDE SOIL INVESTIGATION - 2000 AND 2001

During excavation and soil in on-site Areas A and B, foundry sand was observed along the western wall of the excavation beneath concrete surfaces and existing buildings. Because of the presence of foundry sand within the western perimeter of the on-site areas, further sampling was necessary to assess the extent of foundry sand west of on-site Areas A and B.

On behalf of EPI, CEC submitted a letter dated March 7, 2000 to the U.S. EPA describing the need to advance shallow push probe soil borings west of on-site Areas A and B. The purpose of the soil borings was to visually evaluate the absence or presence of foundry sand material beneath concrete pavement adjacent to the western portions of previously identified on-site Areas A and B. The task was also undertaken to provide information to better understand the potential extent and effort required to complete ongoing removal actions at the Site. As discussed in the March 7, 2000 letter, a total of 10 soil borings were planned to be advanced at locations immediately west of on-site Areas A and B.

During a conference call between U.S. EPA, EPI, and CEC on March 9, 2000, U.S. EPA requested that additional areas of the Site that are covered by concrete also be evaluated during the supplemental soil boring event. On March 10, 2000, CEC submitted a revised letter to U.S. EPA that included an expanded scope of soil sampling. The revised letter discussed the drilling and sampling of 22 additional soil borings at locations along the northern portion of the Site. Accordingly, 32 soil borings were advanced at locations west of on-site areas A and B. Soil sampling was initiated on March 14, 2000.

Preliminary results of the soil sampling were discussed between U.S. EPA, EPI, BBC, and CEC in a conference call on March 16, 2000. During the conference call, U.S. EPA raised the issue that foundry sand material may be present beneath other existing structures (i.e., buildings) at the Site. As a result, five additional soil borings were advanced within Site structures on March 27, 2000. A preliminary report of the soil sampling at the 37 total locations was submitted to the U.S. EPA on April 28, 2000.

Based on the findings of the soil sampling west of on-site Areas A and B, CEC submitted a letter dated April 28, 2000 to inform the U.S. EPA of EPI's intent to advance additional shallow push probe soil borings at the Site. The purpose of additional sampling was to further evaluate the absence or presence of source materials or lead contamination in soil under Site buildings and other areas of the Site. This task was being undertaken to provide additional information to better understand the potential extent and effort required to complete the ongoing removal action. The additional soil sampling locations were approved by U.S. EPA in a letter to EPI dated May 9, 2000. A revised letter was submitted to U.S. EPA on May 12, 2000 detailing the approved soil sampling approach. The additional soil sampling was implemented in May 2000.

Supplemental soil sampling activities were performed at the site during three events, March 14 – 17, 2000, March 27, 2000, and May 15 – 22, 2000. During each sampling event, each soil boring was advanced with a push probe tool operated by Terra Probe, Inc. under the supervision of CEC. During this supplemental sampling, 102 soil borings were advanced at the Site. Initially, soil borings SB-WFS-001 through SB-WFS-032 were advanced at the Site during March 14 – 17, 2000, at locations outside of existing buildings as described in the March 10, 2000 letter to U.S. EPA. Subsequently, soil borings SB-WFS-033 through SB-WFS-037 were advanced on March 27, 2000, at specific locations inside of a limited number existing buildings. Soil borings SB-WFS-38 through SB-WFS-102 were advanced both outside and inside existing buildings at the Site from May 15 – 22, 2000. Selection of boring locations was based on a review of building construction history, building operations history, and accessibility. Based on this review, boring locations within the Site buildings and structures constructed after the sand foundry operations commenced (around 1932) were evaluated.

A summary report of the soil sampling and analysis activities and results was submitted to U.S. EPA in a report dated July 7, 2000.

As discussed in the July 7, 2000 report, lead-impacted soil and foundry sand was discovered to be present beneath Site concrete pavement and building structures. The impacted material was generally present as a thin (0.5 to 2.0 foot) seam beneath the majority of the Site.

4.5 FOCUSED FEASIBILITY STUDY - 2001

In the winter of 2001, CEC performed a Focused Feasibility Study (FFS) to develop a prioritized listing of technologies and alternatives that may be applied to remediation of lead impacted soils present beneath buildings and structures at the Site (see Section 4.4.1).

Based on development of primary selection criterion, consideration of qualitative factors, and implementation costs, six cleanup technologies were identified as potentially feasible and cost-effective. In order of preference, these technologies include:

1. Electrokinetic (EK) Separation
2. Wet/Dry Process Separation
3. Solidification
4. Chemical Stabilization
5. Soil Flushing
6. Soil Washing

Electrokinetic (EK) Separation, as an emerging technology, drew the highest score from the selection matrix, primarily due to the negligible building demolition required, and relatively high removal efficiencies. Potential drawbacks inherent to application of EK Separation at the Delta Site included interference from reinforcing steel present in building floors (or unmarked underground utilities), premature precipitation of lead due to the inability to properly augment existing soil chemistry, and potentially lengthy time period required for reduction of high level (>5,000 mg/kg) contamination. Bench scale testing of this technology was needed to evaluate the feasibility of implementation, and confirmation of site-specific cleanup efficiency.

For the bench-scale study, foundry sand was collected from three locations at the Site for subsequent use during electrokinetics bench-scale testing. These sampling points were located within the immediate vicinity of existing soil sampling locations SB-WFS-94, SB-WFS-79, and SB-WFS-69. Based on the results of the Supplemental Soil Sampling performed at the Site in May 2000 and reported to U.S. EPA in July 2000, these sampling locations were representative of low, medium, and high concentrations of total lead in foundry sand, respectively

Results of the bench-scale study indicated that EK could be applied to the Site for remediation of lead-impacted soil. However, the cost for installation, operation, and maintenance was extremely high and thus cost prohibitive. As a result, CEC focused on the existing excavation and removal technology to address the presence of impacted materials beneath buildings and structures.

4.6 ADDITIONAL ENVIRONMENTAL INVESTIGATIONS – 2001 AND 2002

In 2001 and 2002, several additional environmental investigations were performed to close data gaps prior to determining Sitewide remedial alternatives. These investigations were necessary to assess the scope of removal activities and to aid in the development of project specifications for building demolition and removal.

These investigations included:

- Western Portions of Plant Nos. 1 and 2 Soil Sampling and Analysis;
- Fewless Creek Soil Sampling and Analysis;
- Fewless Creek Sediment Sampling and Analysis;
- Miscellaneous Areas Soil Sampling and Analysis;
- Facility Dust Sampling and Analysis; and,
- Facility Asbestos Sampling and Analysis.

Summaries of these investigations in provided in the following sections.

4.6.1 Western Portion of Plant Nos. 1 and 2 Soil Sampling and Analysis

Concurrent to the completion of the FFS, CEC evaluated the presence or absence of foundry sand and/or soil containing lead concentrations greater than 400 mg/kg beneath the western portion of Plant Nos. 1 and 2. Soil borings were advanced at four locations within the western portion of Plant No. 1 (SB-WFS-126 through SB-WFS-129), three locations west of Plant No. 1 near existing soil boring location SB-WFS-54 (SB-WFS-122, SB-WFS-123, and SB-WFS-124), and two locations within the western portion of Plant No. 2 (SB-WFS-120 and SB-WFS-121). In the western portion of Plant No. 1, total lead concentrations ranged from 14.2 mg/kg (SB-WFS-126) to 23,100 mg/kg (SB-WFS-127). In addition, lead was detected at SB-WFS-129 at a concentration of 7,840 mg/kg. In the area near existing boring location SB-WFS-54, total lead concentrations ranged from 33 mg/kg (SB-WFS-124) to 356 mg/kg (SB-WFS-123). Within Plant No. 2, lead was detected at concentrations of 6.1 mg/kg (SB-WFS-121) and 7.8 mg/kg (SB-WFS-120).

As a result, the northwestern portion of Plant No. 1 was demolished (Phase 8 Activities) and soil was removed from all underlying areas (identified as the Northwest Storage Area – see Section 4.7.8.1) yielding total lead concentrations greater than 400 mg/kg.

4.6.2 Fewless Creek Soil Sampling and Analysis

CEC evaluated the presence or absence of foundry sand in backfill material around the Fewless Creek culvert in the South Yard Area and in the West Employee Parking Area. In the South Yard Area, this activity was performed by cutting and removing the concrete pavement from an area immediately above and adjacent to the buried Fewless Creek culvert and visually evaluating whether foundry sand material was present as backfill around the culvert. If foundry sand material was not observed in the near surface at locations adjacent to the Fewless Creek culvert, CEC manually removed some soil in order to evaluate subsurface conditions adjacent to the culvert pipe. This evaluation was performed at three locations along the length of the buried Fewless Creek culvert in the South Yard area.

In addition, a RAWPA for additional soil sampling along the Fewless Creek culvert was submitted to U.S. EPA on December 14, 2001, while U.S. EPA reviewed the RAWPA for Alternative No. 4. Soil sampling activities were performed in February 4-6, 2002 during the review of Alternative No. 4 by U.S. EPA. A report of these activities was prepared and submitted to U.S. EPA on March 21, 2003.

4.6.3 Fewless Creek Sediment Sampling and Analysis

Sediments accumulated within the buried culvert were sampled and characterized for the presence of lead, VOCs, SVOCs, and PCBs. Sampling was performed during Phase 3 RA activities (see Section 4.7.3). Samples were collected by CEC on September 12, 2002 and September 19, 2002, and October 24, 2002. Characterization samples were collected at six locations within the culvert at the following locations:

- Upgradient of the culvert opening immediately west of Van Buren Street (VCD-14-0.5);
- Three locations within the length of the buried culvert beneath the BBC facility including:
  - Along the north-south extension immediately east of Van Buren Street (VCD-13-0.5),
  - In the northern portion of the West Employee Parking Area near existing soil sample location SB-WFS-112 (VCD-12-0.5),
  - In the South Yard Area between SB-WFS-115 and SB-WFS-116 (VCD-11-0.5);
- One location within the new section buried culvert downstream of the BBC facility (VCD-10-0.5); and
- One location downstream of the buried culvert immediately east of Jackson Street (VCD-09-0.5).

Each sample was submitted under chain-of-custody procedures to STL in North Canton, Ohio for analysis of VOCs, SVOCs, PCBs, and lead.

These data results are presented in Table 1. As shown, low concentrations of some VOCs, PCBs, and PAHs were detected in the Fewless Creek sediments. Also total lead concentrations greater than the applicable ecological standard of 200 mg/kg were also detected at several locations. As a result, sediment within the Fewless Creek culvert was removed during subsequent remedial phases of work at the Site.

4.6.4 Miscellaneous Soil Sampling and Analysis

Preliminary investigations were also performed to further evaluate the presence or absence of buried foundry sand: (1) in the area of construction of proposed Building C-10, immediately southeast of Plant No. 3 (soil borings SB-WFS-103 through SB-WFS-109), and (2) along the buried portion of the Fewless Creek culvert underlying the South Yard area (SB-WFS-115 through SB-WFS-119), and (3) in the West Employee Parking Area (SB-WFS-110 through SB-WFS-114). This soil sampling was performed in October 2001.

As shown, in Table 2, total lead was detected at concentrations greater than 400 mg/kg in the West Employee Parking Area (SB-110 [917 mg/kg], SB-111 [456 mg/kg], and SB-112 [398 mg/kg; greater than DQO of 360 mg/kg]) and South Yard Area (SB-115 [4,020 mg/kg], SB-117 503 mg/kg], and SB-119 [1,420 mg/kg]).

As a result, soil in the South Yard Area and in the construction area of proposed building C-10 was removed during Phases 7 and 8. Lead concentrations in the West Employee Parking Area were addressed through environmental covenants discussed in Section 4.8.

4.6.5 Facility Dust Sampling and Analysis

In addition, the presence or absence of lead dust was evaluated on interior structures of the buildings to be demolished as part of Alternative No. 4. In October 2001, wipe samples of dust were collected from the surfaces of the facilities targeted for demolition. Wipe samples were randomly collected from 20 to 30 locations within the facility. These data were presented to U.S. EPA in a letter report dated November 19, 2001.

4.6.6 Facility Asbestos Sampling and Analysis

A supplemental asbestos survey was performed to address areas of the Delta facility that were not evaluated by BBC during a previous asbestos survey conducted in 1994. CEC reviewed prior asbestos survey results collected by BBC in 1994, and field verified the survey results during the preliminary environmental investigations. During this review, CEC supplemented the previous asbestos survey by collecting samples from roofing materials located beneath foam insulation at the Delta facility to evaluate whether asbestos-containing material (ACM) was present in the roofing material. Three roofing material samples were collected and submitted to an accredited laboratory for asbestos analysis. Data results were summarized in a letter report to U.S. EPA dated November 19, 2001.

4.7 ONSITE REMOVAL - 2002 - 2004

A RAWP Addendum (RAWPA) was prepared at the request of the U.S. EPA Region 5 following agency review of a report prepared by CEC, on behalf of EPI and BBC, entitled *Remediation Alternatives Narrative, Alternative No. 4, Former Eagle-Picher Industries, Inc. Facility, Delta, Ohio* submitted to U.S. EPA on June 6, 2001. U.S. EPA comments from its review of the report were presented to EPI in a letter dated July 16, 2001. EPI and BBC responses to these comments were provided with the submittal of the RAWP Addendum on November 12, 2001 (revised and resubmitted on December 14, 2001). However, due to the discovery of lead-impacted soil beneath the western portion of Plant No. 1 in March 2002 (see Section 4.6.1), Alternative No. 6B was developed and negotiated between EPI and BBC. Alternative No. 6B addressed the additional area of impact beneath the western portion of Plant No. 1 and was conducive to current and future BBC plant operations.

Remediation Alternative No. 6B was developed to address continued remediation activities associated with the removal of buried foundry sand located beneath concrete and building structures at the active BBC facility. Alternative No. 6B was similar to Alternative No. 4, however, the major difference was the sequencing of areas of remediation to coordinate with active BBC operations.

Alternative No. 6B generally consisted of four sequential steps, which were repeated through various manufacturing areas of the Site. These steps include:

- Construction of new buildings to replace those slated for whole demolition, or consolidation of existing operations within existing buildings to accommodate temporary or permanent relocation of manufacturing operations;
- Relocation of manufacturing operations to the new structures or consolidated buildings;
- Demolition and treatment of contaminated foundry sand and soils under the vacated building or manufacturing area; and,
- Restoration of the building or manufacturing area if maintained, or conversion to paved parking surfaces if demolished in whole.

In total, nine separate phases of activity (Phases 1 through 9) were projected, each generally representing a major sequence or milestone in the remediation process. A description of each phase of activity is included in the following sections.

Pre-engineering activities were performed at the Site in the fall of 2001 to facilitate relocation, demolition, remediation, and restoration activities associated with implementation of Alternative No. 4, and eventually, Alternative No. 6B activities. The pre-engineering activities included detailed mapping of aboveground and below ground utilities, structures, traffic flows, and current manufacturing and storage areas in the areas that would be subject to relocation, demolition, remediation, and reconstruction. This information was used to develop detailed plant removal drawings that were used to procure various contractors. Information needed for isolation of structural, mechanical and electrical components were also collected and evaluated. Relocation logistics were examined including equipment movement and storage requirements. Pre-engineering activities were coordinated with BBC personnel and incorporated with existing facility drawings as available. Upon completion of the pre-engineering evaluation, this information was utilized to prepare plans and specifications associated with the relocation, demolition, remediation, and construction tasks.

Upon completion of Pre-Engineering Planning activities (including development of plans and specifications, and contractor bid evaluations), field activities associated Alternative No. 6B were implemented in June 2002. Each phase was designed to address the removal of foundry sand and soil exceeding 400 mg/kg of lead in all areas and sediments exceeding 200 mg/kg of lead within the Fewless Creek buried culvert. Impacted soils and sediments were treated in the same manner as previously approved in the October 29, 1999 RAWP (as discussed above in Section 4.3.4). Copies of laboratory data associated with the onsite removal is presented in Appendix I.

4.7.1 Phase 1 Activities

Phase 1 activities were initiated on June 19, 2002 with a planning meeting between representatives from EPI, BBC, CEC, ENTACT, the Village of Delta, and Quantum Management Group (QMG). Village of Delta was involved to inform them of Site activities, possible disruptions to traffic patterns around the Site, and plans for emergency response. Conversion from Alternative No. 4 to Alternative No. 6B was also discussed.

At the start of Phase 1, CEC contracted with Arbor East Locating of East Fenwick, Michigan to locate and confirm underground utilities at the Site. These activities were completed within two days and an underground utility map was generated for use during Site excavation activities.

On June 21, 2002, CEC contracted with Jersey West Drilling of Mason, Ohio to advance two geotechnical soil borings in the planned location of the New Graphite Storage Building near the northern perimeter of the property and east of Plant No. 3. Each boring was advanced to 11.5 feet below the ground surface and soil samples collected from geotechnical purposes prior to future building construction activities.

On June 26, 2002, a RA pre-construction conference was held at the facility. In attendance were representatives from U.S. EPA, Weston, CEC, BBC, Village of Delta, ENTACT, and QMG. The purpose of the meeting was to discuss remediation Alternative No. 6B and the nine phases associated with the RA alternative.

During mobilization activities for Phase 1, locations for total suspended particulate (TSP) monitors were established by ENTACT at a downwind location (northeast side of the property) and upwind location (southwest side of the property). Other mobilization activities included construction of mixing cells for stabilization of impacted soil, establishment of Site offices (i.e., trailers) and equipment storage, and calibration of TSP monitors.

Phase 1 field activities were initiated on June 27, 2002 with concrete cutting and removal in the area immediately east of Plant No. 3 north of an existing loading dock (referred to as Area P3). Approximately, 1,300 square feet (22 ft. x 59 ft.) of concrete were removed from this area (approximately 36 cubic yards). Soil excavation depths ranged from 2 feet to 6 feet, with deeper excavations performed on the southern limit of the area immediately adjacent to the north wall of the Plant No. 3 loading dock. The deeper excavation was performed due to the presence of possible organic (i.e., oily) impact. The excavations were ceased when XRF screening indicated that total lead concentrations were consistently less than 400 mg/kg. Altogether, approximately 210 tons of impacted material was removed from Area P3.

Five verification soil samples were collected from Area P3. Two verification soil samples (VNP3-01-2.0 and VNP3-02-2.0) were collected from the bottom of the excavation and two verification soil samples (VNP3-03-1.0 and VNP3-04-1.0) were collected from the east and west sidewalls, respectively. The fifth verification soil sample (VNP3-05-6.0) was collected from the southwest corner of the P3 area. Samples were analyzed for lead, VOCs, SVOCs, and PCBs, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 3.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Soils impacted with organic compounds were stockpiled and managed separately. After mixing of the lead-impacted stockpile, three discrete samples (Batch 01-1, Batch 01-2, and Batch 01-3) and one composite sample (Batch 01-C) were collected from the stockpiled material. The three discrete samples were analyzed for VOCs, SVOCs, PCBs, and TCLP metals. The composite sample was split with the U.S. EPA oversight representative analyzed from TCLP lead and paint filter analysis. Also, one characterization sample (Batch 01-4) was collected from the apparent organic-impacted soil stockpile. As shown in Table 4, characterization data from each sample indicated that Universal Treatment Standards (UTS) were not exceeded. As a result, the stockpiled material was transported offsite for disposal to Republic's Carlton Farms facility.

Another activity that was planned for completion during Phase 1 was the construction of a New Graphite Storage Building. This activity was postponed until Phase 5 to facilitate Site operations and allow time for permitting and design of the new building.

4.7.2 Phase 2 Activities

Phase 2 activities were performed throughout the summer of 2002. During Phase 2, relocation and facility preparation activities were performed. Materials stored in Buildings A-1, A-3, and A-4 were relocated to Plant No. 2 and portions of Plant No. 1. Centrifugal machining in Building A-2, bar storage in Building A-5, a jib crane in Building A-2, and miscellaneous equipment from Buildings A-1 through A-5 were relocated during this phase. Structural, mechanical, and electrical components in Building A-1 were permanently isolated for scheduled demolition of Building A-1.

In addition, during Phase 2 a used air compressor was purchased and placed into the western end of Plant No. 3. The air compressor was obtained for possible use during relocation of the existing air compressors located in Building B-26.

4.7.3 Phase 3 Activities

Phase 3 activities initiated on July 1, 2002, and included floor removal and remediation activities in Buildings A-2, A-3, A-4, and A-5. RA activities in these areas were performed throughout the summer and completed in October 2002. The progression of removal activities proceeded from

Building A-5, to Building A-4, to Building A-3, to Building A-2, and Building A-1. Due to the pace of RA activities, progression into Plant No. 1 buildings (RA Phases 4, 5, and 6) was not possible due to ongoing operations by BBC. BBC required that the construction of a New Graphite Storage Building be completed so that equipment and material could be relocated from the Plant No. 1 buildings. Since the New Graphite Storage Building was not complete after Phase 3 RA activities, the remediation crew (ENTACT) de-mobilized from the Site on October 3, 2002.

4.7.3.1 Building A-5

Soil removal activities in Building A-5 began in July 2002 and were completed in August 2002. Concrete floors were saw-cut and removed. Underlying impacted soil was removed to a depth of approximately 4.2 feet below the original floor surface (bofs). At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 300 tons of impacted soil was removed from Building A-5. During the additional soil removal, underpinning of existing foundations in Building A-5 was necessary.

Six verification soil samples (VNA5-01-4.2, VNA5-02-4.2, VNA5-03-4.2, VNA5-04-4.2, VNA5-05-4.2, and VNA5-06-4.2) were collected on July 15, 2002 from the Building A-5 excavation. Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 5.

Receipt of data analyses indicated that additional soil was required to be removed in Building A-5 in the vicinity of VNA5-03-4.2 (near east wall) and VNA5-06-4.2 (near south wall). As a result, impacted soil was removed to a depth of approximately 5 feet bofs in this area. Subsequently, verification samples VNA5-03-4.2R and VNA5-06-4.2R were re-collected on July 23, 2002. As shown in Table 5, total lead concentrations in the re-collected samples were less than 400 mg/kg.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA, and the area was restored to interior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. After mixing of the lead-impacted stockpile, one characterization sample (Batch 02-1) was collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, the stockpiled material was transported offsite for disposal to Republic's Carlton Farms facility.

Upon completion of remediation activities, the building floors were restored to current operating conditions to accommodate future use. Building A-5 restoration also included placement of concrete for future aboveground storage tanks. These tanks were installed in late 2002.

4.7.3.2 Building A-4

RA activities in Building A-4 began in July 2002 and were completed in September 2002. Underlying impacted soil was removed to a depth of approximately 4.0 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 520 tons of impacted soil was removed from Building A-4. During soil removal in Building A-4, temporary structural supports were installed to support the building roof and structure. In addition, structural column underpinning and replacement was necessary in Building A-4.

On August 8, 2002, seven verification soil samples (VNA4-01-4.0, VNA4-02-4.0, VNA4-03-4.0, VNA4-04-4.0, VNA4-05-4.0, VNA4-06-2.0 [sidewall], and VNA4-07-2.0 [sidewall]) were collected from the Building A-4 excavation. Due to a lead concentration greater than 400 mg/kg, additional excavation and repeat verification sampling was necessary in the location of VNA4-06-2.0R. This sample was collected on August 13, 2002. Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 6.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpile 03 contained of approximately 220 tons of impacted soil from Building A-4. Stockpile 04 contained of approximately 140 tons of impacted material from Building A-4. Stockpile 05 contained approximately 160 tons of impacted material from Building A-4. In addition, Stockpile 07 was created with soil from Building A4 and contained approximately 220 tons. Altogether, approximately 740 tons of material were excavated from Building A-4.

Building foundations within Building A-4 were encapsulated with Lead Barrier Compound (LBC) prior to backfilling the area.

After mixing of the lead-impacted stockpiles, three characterization samples (Batch 03-1, Batch 04-1, and Batch 05-1) was collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, the stockpiled material was transported offsite for disposal to Republic's Carlton Farms facility.

Upon completion of remediation activities, the building floors were restored to current operating conditions (i.e., interior concrete) to accommodate future use.

4.7.3.3 Building A-3

RA activities in Building A-3 began in September 2002 and were completed in October 2002. Underlying impacted soil was removed to a depth of approximately 4.2 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg.

On September 18, 2002, eight verification soil samples (VNA3-01-4.15, VNA3-02-4.15, VNA3-03-4.15, VNA3-04-2.50, VNA3-05-4.15, VNA3-06-4.15, VNA3-07-4.15, and VNA3-08-4.15) were collected from the Building A-3 excavation. Samples were analyzed for total lead, in accordance with the approved RAWPA. Due to the fact that a sample was not analyzed for VOCs and SVOCs as per the approved RAWPA, the location for verification sample VNA3-06-4.15 was resampled on June 20, 2003 by drilling with a geoprobe drilling rig. A summary of laboratory results is provided in Tables 7 and 8.

Upon remediation verification, restoration activities (i.e., backfilling) were performed in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpile 08 contained approximately 280 tons of impacted soil from Building A-3. Stockpile 09 contained approximately 340 tons of impacted soil from Building A-3.

Building foundations within Building A-3 were encapsulated with LBC prior to backfilling the area.

After mixing of the lead-impacted stockpiles, two characterization samples (Batch 08-1 and Batch 09-1) were collected and submitted to STL for analysis of TCLP lead and paint filter. Characterization data indicated that UTS was not exceeded. As a result, Stockpiles 08 and 09 were transported offsite for disposal to Republic's Carlton Farms facility.

Upon completion of remediation activities, the building floors were restored to current operating conditions (i.e., interior concrete) to accommodate future use.

4.7.3.4 Building A-2

RA activities in Building A-2 began in August 2002 and were completed in September 2002. Underlying impacted soil was removed from an area of approximately 1,600 square feet to a depth of approximately 3.5 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 240 tons of impacted soil was removed from Building A-2.

On August 27-29, 2002, six verification soil samples (VNA2-01-3.75, VNA2-02-3.75, VNA2-03-1.5 [sidewall], VNA2-04-3.75 [sidewall], VNA2-05-2.0 [sidewall], and VNA2-06-2.0 [sidewall]) were collected from the Building A-2 excavation. Samples were analyzed for total lead, in accordance with the approved RAWPA. Due to the fact that a sample was not analyzed for VOCs and SVOCs as per the approved RAWPA, the location for verification sample VNA2-02-3.75 was resampled on June 20, 2003 by drilling with a geoprobe drilling rig. A summary of laboratory results is provided in Tables 8 and 9.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpile 06 contained of approximately 240 tons of impacted soil from Building A-2.

Building foundations within Building A-2 were encapsulated with LBC prior to backfilling the area.

After mixing of the lead-impacted stockpiles, one characterization sample (Batch 06-1) was collected and submitted to STL for analysis of TCLP lead and paint filter. Characterization data indicated that UTS was not exceeded. As a result, Stockpile 06 was transported offsite for disposal to Republic's Carlton Farms facility.

Upon completion of remediation activities, the building floors were restored to current operating conditions (i.e., interior concrete) to accommodate future use.

4.7.3.5 Building A-1

Building A-1 was demolished on July 22, 2002. As part of an agreement with BBC, a temporary overhead doorway was constructed on the north wall of Plant No. 2 where a prior doorway existed to Building A-1. This doorway was converted to a block wall in June 2003. Impacted soil underlying former Building A-1 is deed restricted as discussed in Section 4.11.

4.7.4 Phase 4 Activities

Phase 4 activities were initiated in January 2003 and included RA activities in the central portion of the Site (Plant No. 1 buildings). An RA kick-off meeting was held on January 28, 2003 to discuss Phases 4 through 6 of Remediation Alternative No. 6B. Meeting attendees included representatives from: U.S. EPA, Ohio EPA, EPI, BBC, CEC, Weston, Quantum Management Group, ENTACT, and the Village of Delta.

Initial activities included construction of a new stockroom enclosure for BBC in Building B-1C prior to relocation of the Building B-19 stockroom and construction of a new wall at the southern perimeter of Building B-13. These activities were completed prior to whole building demolition for Buildings B-16, B-17, B-18, B-19, and B-20. Prior to commencing demolition, existing product storage and manufacturing operations were relocated to locations specified by BBC. Additionally, the ball mill machine and screener located in Building B-18 were permanently relocated to Building B-13. Building utilities including gas, electric, fire suppression, and air handling ductwork were also terminated and/or relocated prior to building demolition.

On February 12, 2003, Phase 4 demolition activities were initiated by demolishing Building B-24. Subsequently, Buildings B-16, B-17, B-18, B-19, and B-20 were demolished during Phase 4. In addition, the "E" Baghouse was decommissioned, demolished, and decontaminated by rinsing, during Phase 4.

Demolition debris was transported to Allied Waste's Adrian Landfill in Adrian, Michigan. Scrap aluminum debris was segregated and transported to Zack's Recycling in Swanton, Ohio.

Remediation of underlying lead-impacted soils in this general area was postponed until Phase 7 remediation of the South Yard Area to allow for former B-16 through B-20 and B-24 area to be used for RA soil stockpiling.

Other relocation activities performed during Phase 4 included relocation of equipment in Building B-25. The equipment from the Oil Storage building (B-25) was relocated to the east side of Building A-5.

4.7.5 Phase 5 Activities

Phase 5 activities shifted to the north and west of completed Phase 4 activities and were performed between February 2003 and September 2003. Specifically, lead-impacted soils below Buildings B-8 through B-15 were remediated using a sequenced approach. Initially, materials stored in Buildings B-8 and B-9 were temporarily relocated to Buildings B-11, B-12, and B-13 and Plant No. 1. The floors were then removed and soils remediated in Buildings B-8 and B-9.

Subsequent Phase 5 activities involved returning and relocating materials stored in Buildings B-11, B-12, and B-13 to Buildings B-8 and B-9. As necessary, overflow bar storage was transferred to Buildings A-3, A-4, and A-5. The floors in Buildings B-11, B-12, and B-13 were then removed and soils remediated. Finally, these areas were restored to current operating conditions.

4.7.5.1 Building B-8

RA activities in Building B-8 began on February 15, 2003 and were completed in March 2003. Underlying impacted soil was removed from an area of approximately 3,500 square feet to a depth of approximately 2.5 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 465 tons of impacted soil was removed from Building B-8.

During excavation of impacted soils in Building B-8, it was discovered that impacted soil was present under some existing building foundations. If impacted soil was observed beneath building foundations, the building wall was underpinned, impacted soils were removed five feet at a time, and the foundation reconstructed as necessary. Foundations beneath the north, east, and west building walls were replaced. In addition, apparent former foundations and brick were removed in the central portion of Building B-8.

A foundation was not present beneath the southern wall and approximately 20 feet on the southern end of the east wall to Building B-8. As a result, after impacted soils were removed from beneath this wall, a new building wall foundation was constructed to support the wall.

On March 3, 2003, one verification soil sample (VNB8-07-2.0 [sidewall]) was collected from the east sidewall of the Building B-8 excavation. On March 4, 2003, two additional verification samples (VNB8-08-2.0 and VNB8-09-2.0) were collected from the north and west sidewalls, respectively. On March 12, 2003, three verification samples (VNB8-01-2.5, VNB8-02-2.5, and VNB8-03-2.0) were collected from the floor of the Building B-8 excavation. On March 14, 2003, two verification samples (VNB8-04-2.5 and VNB8-05-2.5) were collected from the floor of the southern portion of the Building B-8 excavation. These samples were submitted to STL for analysis of total lead, VOCs, and SVOCs. A summary of laboratory results is provided in Table 10.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete. Building floors were restored to current operating conditions to accommodate future use. Also, two building structural columns were removed and replaced during restoration of Building B-8. Soil beneath the structural columns was removed and handled with other excavated soil from Building B-8.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpile 10 contained of approximately 265 tons of impacted soil from Building B-8. Stockpile 12 contained approximately 200 tons of impacted soil from Building B-8.

Building foundations within Building B-8 were encapsulated with LBC prior to backfilling the area.

After mixing of the lead-impacted stockpiles, three characterization samples (Batch 10, Batch 11, and Batch 12) were collected and submitted to STL for analysis of TCLP lead and paint filter. In addition, characterization samples Batch-10 and Batch-11 were analyzed for VOCs, TCLP VOCs, SVOCs, and PCBs since these soils were removed from an area yielding organic-like odors. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 10, 11, and 12 were transported offsite for disposal to Adrian Landfill.

4.7.5.2 Building B-9

RA activities in Building B-9 began on February 24, 2003 and were completed in March 2003. Underlying impacted soil was removed from an area of approximately 3,000 square feet to a depth of approximately 3.5 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 465 tons of impacted soil was removed from Building B-9.

During excavation of impacted soils in Building B-9, it was discovered that impacted soil was present under existing building foundations. These soils were removed five feet at a time, and the foundation reconstructed. Portions of foundations beneath the west, east, and south building walls were replaced.

On March 13, 2003, a verification soil sample (VNB9-05-3.5) was collected from the west sidewall of the Building B-9 excavation. This sample was collected in advance of wall underpinning activities. On March 19, 2003, four verification soil samples (VNB9-01-2.5, VNB9-02-2.5, VNB9-03-3.0, VNB9-04-3.0) were collected from the floor of the Building B-9 excavation. In addition, a water sample (VNB9-06-4.0) was collected from a wet area in the southeast portion of the Building B-9 excavation. Sample VNB9-06-4.0 was also split with a representative of U.S. EPA. Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 11.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete. Building floors were restored to current operating conditions to accommodate future use. Also, two building structural columns were removed and replaced during restoration of Building B-9.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 13 and 14 contained of approximately 185 tons and 280 tons, respectively, of impacted soil from Building B-9.

Building foundations within Building B-9 were encapsulated with LBC prior to backfilling the area.

After mixing of the lead-impacted stockpiles, two characterization samples (Batch 13 and Batch 14) were collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 13 and 14 was transported offsite for disposal to Adrian Landfill.

4.7.5.3 Buildings B-11 through B-13

RA activities in Building B-11 through B-13 began on March 25, 2003 and were completed by May 2003. Initial activities in Buildings B-11 through B-13 included permanent or temporary relocation of an in-ground Toledo scale, platform scale, tub dumper, mixing bin steel floor plates, and a management office. In addition, miscellaneous product and materials from B-12 and B-13 were relocated to other portions of the facility.

During excavation activities, ten roof support columns in Buildings B-12 (3 columns) and B-13 (7 columns) were removed, the underlying soils were removed, and the roof columns were reconstructed. Subsequently, concrete floor sections were removed and soils excavated as previously approved. Underlying impacted soil was removed from an area of approximately 4,000 square feet to a depth of approximately 3 feet bofs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 940 tons of impacted soil was removed from Buildings B-12 and B-13.

During excavation of impacted soils in the eastern portion of Buildings B-12 and B-13, it was discovered that impacted soil was present under the building foundations. These soils were removed five feet at a time, and the foundation reconstructed. Portions of foundations beneath the east building walls were replaced.

Beginning April 15, 2003, verification soil samples were collected from the Buildings B-11 through B-13 excavation. These samples included VNB11-01-2.0, VNB12-01-3.0, VNB12-02-3.0, VNB12-03-2.5, VNB12-04-4.0, VNB12-05-3.0, VNB12-06-2.5, VNB13-01-3.0, VNB13-02-3.0, VNB13-03-3.0. Samples were analyzed for lead, in accordance with the approved RAWPA. In addition, some soil samples were also analyzed for VOCs, SVOCs, and PCBs. A summary of laboratory results is provided in Tables 12 through 14.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to interior concrete. Building floors were restored to current operating conditions to accommodate future use. In Building B-11, a floor drain and storm drain piping were replaced.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 15, 16, 17, 18, 19 contained of approximately 150 tons, 180 tons, 220 tons, 240 tons, 150 tons, respectively, of impacted soil from Buildings B-11 through B-13.

Building foundations within Buildings B-11 through B-13 were encapsulated with LBC prior to backfilling the area.

After mixing of the lead-impacted stockpiles, five characterization samples (Batch 15 through Batch 19) were collected and submitted to STL for analysis of TCLP lead and paint filter. In addition, characterization samples from Batches 16, 17, and 18 were also analyzed for TCLP VOCs, SVOCs, and PCBs. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 15 through 19 were transported offsite for disposal to Adrian Landfill.

4.7.5.4 Buildings B-14 and B-15

Impacted soil underlying Buildings B-14 (Transformer) and B-15 (Water Room) was not removed during Phase 5 RA activities. Instead, removal from this area was postponed until Phase 7 or later, and ultimately not performed due to the placement of future land use restrictions on this area of the Site.

4.7.5.5 Building B-21

RA activities in Building B-21 were initiated in March 2003 with the excavation of three shallow test pits to evaluate the nature of underlying soil adjacent to centrifugal casting operations equipment. The test pits indicated the presence of foundry sand immediately adjacent and below centrifugal casting operations equipment. As a result, complete relocation of the centrifugal casting operations (including furnaces, casters, ovens, etc.) and six structural building columns would be necessary in order to completely remove impacted soil from Building B-21. Based on the nature and extent of this effort, EPI and BBC discussed the possibility of placing future land use restrictions on Building B-21 and the underlying soil (see Section 4.11 for additional discussion). As a result, planned RA excavation activities in Building B-21 were not completed.

4.7.5.6 New Graphite Storage Building

Permitting, design, and preparation of plans and bid specifications associated with the 1,800-square foot New Graphite Storage Building were performed beginning in August 2002 and were completed in May 2003. These activities also included contractor selection, budgeting, and contracting. Construction activities were initiated on June 2, 2003 and completed August 26, 2003. The new building was built on the northern portion of the property immediately east of Plant No. 3.

After construction of the New Graphite Storage Building, further Site activities associated with the RA were pending completion of negotiations between EPI and BBC regarding sequencing of RA work and business matters regarding the past sale of the property from EPI to BBC. Negotiations continued through November 2003. In addition to the sequencing related to Buildings B-14, B-15, and B-21 (Centrifugal Casting Operations), another cause for concern by EPI and BBC was sequencing of activities should the Fewless Creek culvert require removal and replacement.

4.7.6 Phase 6 Activities

Originally, Phase 6 RA activities planned for construction of a new loading dock at Building B-11 and preparation for relocation of the Centrifugal Casting Operations in Buildings B-14, B-15, and B-21. However, considering the likelihood of placing institutional controls on portions of the Site, the sequence of RA activities (specifically Phase 6) could not be agreed between EPI and BBC.

On November 26, 2003, U.S. EPA sent a letter to EPI and BBC requiring remobilization of the RA contractor to the Site prior to December, 15, 2003, and continuation of RA. Though negotiations had not been completed and the removal sequence not agreed upon, CEC prepared a RAWPA for additional soil sampling around the Fewless Creek culvert. A RAWPA for additional soil sampling was submitted to U.S. EPA on December 8, 2003, and verbally approved by U.S. EPA on December 12, 2003 (written approval received on December 18, 2003).

Soil sampling activities began on December 15, 2003 and were completed by December 22, 2003. Altogether, 50 soil borings were advanced on 10-foot centers on each side of the entire length of the buried culvert on the Site. At each boring location, 10 soil samples were collected for potential analysis. Soil screening using an XRF was performed in early January 2004, and laboratory analyses were performed in January and February 2004. Soil results were submitted to U.S. EPA in a report dated May 3, 2004. The report indicated that only a few isolated pockets of impacted soil (i.e., lead concentrations greater than 400 mg/kg) were present near the culvert and that culvert removal would not be necessary.

On January 15, 2004, CEC submitted a letter to U.S. EPA on behalf of EPI and BBC discussing a proposed change in RA scope of work. The proposed change in scope was based on an agreement between EPI and BBC that would both make the project more cost effective while providing a concomitant degree of protection to human health and the environment and resolve significant technical challenges associated with the existing remediation plan. Specifically, due to the ongoing manufacturing operations at the Site, remediation of areas under the centrifugal casting area as was contemplated – calling for shutdown and disassembly of the entire manufacturing process, removal of contaminated material and reconstruction of the process – posed logistical and technical challenges and a risk to the resumption of these manufacturing activities in a timely manner. Further, based on experience at the Site it was clear that the impacted underlying materials were isolated from persons and the environment.

These methods were proposed in the original EE/CA for the Site. The RAWPA discussing Phases 6 through 9 planned for complete removal of contaminated material, and was based on a preference for an unrestricted property in the future. However, EPI and BBC had since agreed that institutional controls were acceptable and preferable for addressing certain portions of the Site.

Accordingly, the following changes were proposed: (1) impacted soil underlying centrifugal casting operations in Buildings B-14, B-15, and B-21 would be left in place, and any future activity restricted in an appropriate deed restriction agreed upon by EPA, and (2) remediation of remaining impacted soil at the property to the industrial soil standards contained in the EE/CA, as opposed to residential soil cleanup standards, future activity at the Site again governed by appropriate deed restrictions.

A Site-specific industrial soil standard of 1,536 mg/kg was specified in the Action Memorandum (Section V – Proposed Action and Estimated Costs) dated August 1999. The standard, which was derived from a Streamlined Risk Evaluation (SRE) (January 1999) and presented in the Engineering Evaluation/Cost Analysis (EE/CA) (June 1999) for the Site, was set as a human health risk-based cleanup level for lead in industrial soils where enforceable institutional controls are provided.

Thus, and in addition to leaving impacted soil beneath Building B-21 (Centrifugal Casting operations), application of the 1,536 mg/kg industrial standard to the Site had the following effect on the remaining removal action activities at the Site:

- No remediation of soils underlying Building B-26 (Compressor Room);
- No remediation of soils in the West Employee Parking Area (with exception of a small area in the southeast corner and possible soils adjacent the Fewless Creek culvert - sampling is ongoing); and,
- Reduction of soil remediation within the North Yard Area (i.e., Maplewood Street area).

On February 18, 2004, U.S. EPA submitted a letter to legal counsel for EPI and BBC indicating approval of the change to the RA scope of work. As a result, Phase 6 was postponed until future use restrictions could be installed for the referenced areas of the property, and RA activities were resumed in February 2004 with Phase 7.

4.7.7 Phase 7 Activities

Phase 7 RA activities were initiated on February 9, 2004. RA contractors and equipment were mobilized and air monitoring stations re-established. A pre-construction meeting was held on February 16, 2004 to discuss the remaining RA scope of work.

4.7.7.1 Northern Portion of South Yard Area

Removal activities began in the northern portion of the South Yard Area (area of former Buildings B-16 through B-20).

During excavation activities, exterior concrete was demolished in order to access the underlying impacted soil. In this area, soil was removed to a depth of approximately 4.0 feet bgs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 1,450 tons of impacted soil was removed from the northern portion of the South Yard Area.

During excavation of impacted soils in the northern portion of the South Yard Area, it was discovered that impacted soil was present under the eastern wall of Building B-9 and the southern wall of Building B-13, and no building foundations were present. These soils were removed five feet at a time, and the foundation reconstructed. Also during excavation in this area, a high voltage line, storm drains, and sanitary piping were relocated, terminated, or replaced. In many instances, hand excavation was necessary. The "D" Baghouse was also disassembled and later reassembled in order to access underlying impacted soil.

Beginning March 9, 2004, eight verification soil samples were collected from the northern portion of the South Yard Area excavation. These samples included VNB23-01-33", VNSY-02-36", VNB20-01-42", VNB19-01-48", VNB19-02-32", VNB16-01-38", VNB18-01-32", and VNB18-02-42". Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Tables 15 through 18.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete. Storm drains and piping were replaced as necessary.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 20 through 27 each contained approximately 160 to 240 tons of impacted soil from the South Yard Area.

After mixing of the lead-impacted stockpiles, eight characterization samples (Batch 20 through Batch 27) were collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 20 through 27 were transported offsite for disposal to Adrian Landfill.

4.7.7.2 North Yard Area

Removal activities began in the North Yard Area on March 20, 2004. During excavation activities, exterior concrete was demolished in order to access the underlying impacted soil. In this area, soil was removed to a depth of approximately 4.0 feet bgs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 1,200 tons of impacted soil was removed from the North Yard Area.

Eight verification soil samples were collected from the North Yard Area excavation. These samples included VNNY-01-30", VNNY-02-16", VNNY-03-12", VNNY-04-31", VNNY-05-15", VNNY-06-18", VNNY-07-85", and VNNY-08-16". Samples were analyzed for lead, in accordance with the approved RAWPA. Selected samples were also submitted for analysis of SVOCs and PCBs. A summary of laboratory results is provided in Table 19.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 28 through 33 each contained approximately 200 tons of impacted soil from the North Yard Area.

After mixing of the lead-impacted stockpiles, six characterization samples (Batch 28 through Batch 33) were collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 28 through 33 were transported offsite for disposal to Adrian Landfill.

4.7.7.3 Eastern Portion of South Yard Area

On April 8, 2004, RA activities began in the eastern portion of the South Yard Area. In this area, soil was removed to a depth of approximately 4.0 feet bgs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 800 tons of impacted soil was removed from the eastern potion of the South Yard Area.

Beginning April 12, 2004, six verification soil samples were collected from the eastern portion of the South Yard Area excavation. These samples included VNSY-01-50", VNSY-02-36", VNSY-03-32", VNSY-04-48", VNSY-05-69", VNSY-06-45". Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 20.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete. As part of the restoration activities for the eastern portion of the South Yard Area, approximately 100 feet of an 8-inch diameter sanitary sewer line was replaced.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 34 through 37 each contained approximately 200 tons of impacted soil from the eastern portion of the South Yard Area.

After mixing of the lead-impacted stockpiles, four characterization samples (Batch 34 through Batch 37) were collected and submitted to STL for analysis of TCLP lead and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 34 through 37 were transported offsite for disposal to Adrian Landfill.

4.7.7.4 Building B-25 Area

RA activities in the Building B-25 Area were initiated on April 2, 2004 and completed in June 2004. The extended remediation timeframe was due primarily to the presence of impacted soil north and northeast of Building B-25.

Initially, Building B-25 and floor concrete was demolished in order to access the underlying impacted soil. As part of the demolition activities, a 30-foot tall utility pole was relocated approximately 30 feet north of the Building B-25 Area.

Prior to demolition, insulation material from the walls and concrete from the floor of Building B-25 were sampled. Insulation samples were collected for asbestos analysis and concrete samples were collected for PCB analysis. Asbestos data indicated that the material did not contain asbestos, and the concrete samples indicated non-detect to very low concentrations of PCBs (Table 20). As a result, no special handling of these demolition materials was necessary. Building demolition was initiated on April 6, 2004.

Excavation activities were performed in the general Building B-25 Area and continued north and east of the Area due to elevated lead concentrations as measured by the XRF meter. Excavation north and northeast of Building B-25 was unanticipated and, thus, performed in a step-wise manner in this direction. Because a deed restriction was to be possibly placed on the property, excavation north and northeast of former Building B-25 continued until total lead concentrations were less than 1,536 mg/kg (the Site-specific industrial scenario risk concentration). At conclusion of excavation activities in this area, the total removal area encompassed approximately 50 feet north and 80 feet east of former Building B-25. As a result of the expanded excavation area, facility fencing was dismantled and later replaced. The average excavation depth in this area was 2 feet below the ground surface. Altogether, approximately 1,400 tons of impacted soil was removed from the Building B-25 Area.

Eleven verification soil samples were collected from the eastern portion of the Building B-25 Area excavation. These samples included VNB25-01-28", VNB25-02-38", VNB25-03-32", VNB25-04-16" (sidewall sample), VNB25-05-18" (sidewall sample), VNB25-06-14" (sidewall sample), VNB25-07-12" (sidewall sample), VNB25-08-12" (sidewall sample), VNB25-09-12" (sidewall sample), VNB25-10-12" (sidewall sample), VNB25-11-32", VNB25-12-32", VNB25-13-32", VNB25-14-33", VNB25-15-18" (sidewall sample), VNB25-16-18" (sidewall sample), and VNB25-17-8" (sidewall sample). Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 21.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 38 through 44 each contained approximately 200 tons of impacted soil from the Building B-25 Area.

After mixing of the lead-impacted stockpiles, four characterization samples (Batch 38 through Batch 44) were collected and submitted to STL for analysis of TCLP lead and paint filter. Batch-38, which was composed of soil from the former Building B-25 area, was also analyzed for PCBs. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 38 through 44 were transported offsite for disposal to Adrian Landfill.

4.7.7.5 New Building B-11 Dock Area

As part of negotiations between EPI and BBC, a new loading dock was constructed on the eastern side of Building B-11. ENTACT was contracted to demolish the concrete in this area and remove soil containing total lead greater than 400 mg/kg. In this manner, soil was removed to approximately 2 feet below the ground surface, and handled consistent with procedures for lead removal.

Prior to further excavation, an underground high voltage line extending from a utility pole approximately 20 feet north of the dock area to the transformer in Building B-14 was relocated.

The relocation involved excavating a trench to a depth of approximately nine feet bgs (i.e., below the depth of the planned B-11 dock), installing pipe conduit, and re-routing the high voltage line. A soil sample (B11-UT-91") was collected from the base of the utility trench and submitted to STL North Canton for analysis of total lead. Work was performed over a weekend since the transformer (which serviced the BBC facility) needed to be shut down.

Subsequently, ENTACT was retained to excavate the New B-11 Dock Area to the depths specified for construction of the loading dock (i.e., approximately 8 feet bgs on the western end of the planned dock and sloping to approximately 2 feet bgs at the eastern end). During soil removal adjacent to Building B-14 (Transformer Building), oily soil was discovered at a depth of approximately 4 feet bgs. This material was characterized by collecting a soil sample (B11-01-48"). The sample was submitted to STL North Canton for analysis of VOCs, SVOCs, and PCBs. Table 11 presents a summary of the laboratory analysis for the soil sample (B11-01-48") collected near Building B-14.

As a result, additional soil was excavated in this area until visible indications of impact were removed. The total depth of excavation adjacent to Building B-14 was approximately 8 feet bgs.

Due to the depth of impact adjacent to Building B-14 and the depth of the planned dock, structural underpinning and foundation replacement was necessary along the eastern wall of B-11, the northern wall of Building B-14, and the northern extent of foundations for Building B-22 ("C" Baghouse). This underpinning was performed to depths of 8 feet bgs.

Additional excavation in the New B-11 Dock Area was necessary along the north-northwestern sidewall due to total lead concentrations greater then 400 mg/kg as measured by the XRF meter. In this area excavation was extended approximately two feet north of the current B-11 dock excavation. Also, during installation of a new sump and stormwater line connection to a storm drain located approximately 30 feet northwest of the B-11 dock, impacted soil was encountered. These soils were removed along the pipe chase to a total lead concentration of 1,536 mg/kg. Verification soil samples in the utility trench area were collected and included: B11-UT01-9", B11-UT02-36", B11-UT03-12", B11-UT04-10".

Upon completion of underpinning and excavation activities, a soil sample (B11-02-96") was collected from the base of the New B-11 Dock Area and submitted to STL North Canton for analysis of total lead, VOCs, SVOCs, and PCBs. These data are summarized in Table 12.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpile 45 contained approximately 260 tons of impacted soil from the New Building B-11 Dock Area.

After mixing of the lead-impacted stockpiles, one characterization samples (Batch 45) was collected and submitted to STL for analysis of TCLP lead, VOCs, SVOCs, PCBs, and paint filter. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpile 45 was transported offsite for disposal to Adrian Landfill.

4.7.7.6 Buildings C-8 and C-9 Area

Soil excavation began June 3, 2004. RA activities in the Building C-8/C-9 Area were initiated on May 7, 2004 and completed in June 2004. Initially, relocation and isolation activities were performed. Building demolition was performed on May 25, 2004.

In the Building C-8/C-9 Area, soil was removed from an area of approximately 40 feet by 50 feet and to a depth ranging from approximately 1 to 2 feet bgs. The deeper areas were encountered on the southwestern portion of the area. Altogether, approximately 200 tons of impacted soil was removed from the Building C-8/C-9 Area.

Six verification soil samples were collected from the Building C-8/C-9 Area excavation. These samples included VNC8C9-01-12", VNC8C9-02-24", VNC8C9-03-9" (sidewall sample), VNC8C9-04-10" (sidewall sample), VNC8C9-05-12" (sidewall sample), VNC8C9-06-15" (sidewall sample). Samples were analyzed for lead, in accordance with the approved RAWPA. A summary of laboratory results is provided in Table 22.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells (Stockpile 44) prior to stabilization for lead (see Section 4.7.7.4 for a description and discussion of analytical results for Stockpile 44).

4.7.8 Phase 8 Activities

Remediation Alternative No. 6B, Phase 8, included relocation of Buildings B-1 through B-7, B-1A, B-1D, and B-1E various construction RA-related activities, demolition, and soil removal from the New West Storage Area and the southern portion of the South Yard Area. These activities were performed between May 2004 and November 2004, and are described in the following sections.

4.7.8.1 New West Storage Area

RA activities in the New West Storage Area (including former Buildings B-1 through B-7, Building B-1C, Building B-1D, and Building B-1E began in early June 2004 and were completed in August 2004.

Initial RA-related activities included significant relocation of facility processes, equipment, and product. Relocation was performed for facility HVAC systems, potable water lines, gas lines, communications, compressed air, offices, files, furniture, and an old press. Concurrent with relocation, RA-related activities included construction of temporary walls on north side of Buildings B-1C, B-1E, and B-8, and construction of restroom modifications and wall construction in Building B-1B.

Also, prior to demolition of structures in the New West Storage Area, the BBC facility fire suppression system and manifold housed in Building B-7 was permanently relocated to Building B-8 and reconnected with the main water line servicing the BBC facility. These activities were performed in May 2004.

As part of the fire suppression relocation, soil was excavated and removed in a small area (4 feet by 4 feet by 4 feet deep) immediately north of the new Building B-8 fire suppression system connection in order to construct new water main valves and from two small (7 feet by 7 feet by 4 feet deep) areas along the main water line in the center of the Maplewood Street area (i.e., between Plant Nos. 1 and 3). ENTACT performed soil removal activities and excavated soil was handled with other soil removed during the Site RA. The excavations and the soil from the excavations were screened for total lead using the XRF meter and organic vapors using a PID. At these locations, total lead concentrations were less than 400 mg/kg and organic vapor levels were consistent with background concentrations (i.e., 0 to 1 ppm).

Demolition initiated on June 19, 2004 for Buildings B-1 through B-7, B-1A, and B-1E. Approximately 500 tons of demolition debris were generated and transported offsite to Adrian Landfill.

Subsequently, concrete floors and exterior concrete was demolished and underlying impacted soil was removed from an area of approximately 10,000 square feet to a depth of approximately 2 to 3 feet bgs. At this depth, XRF screening yielded total lead concentrations consistently less than 400 mg/kg. Altogether, approximately 2,200 tons of impacted soil was removed from the New West Storage Area.

During excavation activities, building foundations within the southern and eastern limit of the New West Storage Area were encapsulated with LBC prior to backfilling.

In addition, soil was removed from an offsite area located east of Van Buren Street, immediately west-northwest of the New West Storage Area. Although this area was offsite of the former EPI property, this area was considered a part of the New West Storage Area. Prior to removal, the City of Delta was notified and appropriate permits were secured.

Removal activities in the Van Buren Street area were initiated on August 18, 2004. Demolition of asphalt pavement was performed prior to soil removal. During removal, a 6-inch diameter storm drain was removed and replaced. The removal area was approximately 20 feet by 50 feet in size to an average depth of 2 feet bgs.

Eighteen verification soil samples were collected from the southern portion of the New West Storage Area excavation. These samples included: VNWS-01-22", VNWS-02-36", and VNWS-03-32" from the south-central portion of this area; VNWS-07-38", VNWS-08-34", VNWS-09-14" (sidewall) from the southwestern portion of this area; and VNWS-11-46", VNWS-12-29" (sidewall), VNWS-13-44", and VNWS-17-29" (sidewall) from the southeast portion of this area. These samples were submitted to STL North Canton for analysis of total lead. A summary of these analytical results is presented in Table 23.

Other verification samples collected from the New West Storage Area included: VNWS-04-24", VNWS-05-13", and VNWS-06-7" (sidewall), VNWS-06B-10", and VNWS-28-20" from the northern portion of this area; VNWS-14-22", VNWS-15-23", and VNWS-16-26" (sidewall) from the northeast portion of the New West Storage Area; VNWS-18-36" and VNWS-19-30" from the former Building B-6 area; and VNWS-25-25", VNWS-26-24", and VNWS-27-21" from the former Building B-7 area. Due to the nearby presence of the former underground storage tank (UST) at former Building B-7, samples collected from the north and northeast portions of this area, and from the former Building B-7 area, were analyzed for total lead, VOCs, SVOCs, and PCBs (Table 23).

Verification samples VNWS-20-34", VNWS-21-8", VNWS-22-8", VNWS-23-12", and VNWS-24-12" were collected from the offsite area along Van Buren Street, located immediately north-northwest of the main New West Storage Area. These samples were submitted to STL North Canton for analysis of total lead. A summary of laboratory results from the New West Storage Area is provided in Table 23.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 48 through 55 and Stockpiles 57 and 65 each contained approximately 220 tons of impacted soil from the New West Storage Area. Accordingly, approximately 2,200 tons of impacted soil was removed from the New West Storage Area.

After mixing of the lead-impacted stockpiles, four characterization samples (Batch 48 through Batch 55) were collected and submitted to STL for analysis of TCLP lead and paint filter. Batches 51 and 52 were also analyzed for VOCs, SVOCs, and PCBs. Characterization data indicated that UTS was not exceeded. As a result, Stockpiles 48 through 55 were transported offsite for disposal to Adrian Landfill (Table 4).

4.7.8.2 Southern Portion of South Yard Area

Excavation in the southern portion of the South Yard Area began in early May 2004. The initial area of removal was in the northwest portion of this area near the existing Building A-3 loading dock. Removal continued south- and eastward until the entire region in the southern portion of the South Yard Area was removed.

On May 3, 2004, during excavation in the northwest region of the southern portion of the South Yard Area, a buried concrete vault was encountered approximately 20 feet east of Building A-3, near the A-3 loading dock. The vault was encountered approximately 2 feet below the ground surface and measured approximately 8 feet by 6 feet by 6 feet deep. The vault appeared to contain oily water. Upon its discovery, removal activities in this immediate area were suspended pending characterization of the vault contents.

A characterization sample of the vault oil (SY-Vault-01) and water (SY-Vault-02) was collected on May 11, 2004, and submitted to STL North Canton for analysis of VOCs, SVOCs, and PCBs. Another sample (SY-Vault-02A) was collected from the water portion of the buried vault and submitted for analysis of total RCRA metals. These data are summarized in Table 24.

The vault contents (approximately 600 gallons) were removed on September 2, 2004, and transported offsite. Subsequently, the vault and surrounding soils were excavated and stockpiled separately from other Site soils. A composite sample (Batch-58) of the stockpile was collected and submitted to STL North Canton for analysis of total VOCs, TCLP carbon disulfide, total SVOCs, total PCBs, and TCLP metals. Characterization data indicated that UTS was not exceeded (Table 4). As a result, Stockpile 58 was transported offsite for disposal to Adrian Landfill. Stockpile 58 contained approximately 260 tons of impacted material.

Excavation in other regions of the southern portion of the South Yard Area ranged in depth from 3 to 7 feet bgs. At these depths, XRF screening yielded total lead concentrations consistently less than 400 mg/kg.

Verification soil samples were collected from the southern portion of the South Yard Area excavation. These samples included VNSY-07-58", VNSY-08-58", VNSY-09-36" (sidewall), VNSY-09B-36", VNSY-10-55", VNSY-11-26", VNSY-12-68", VNSY-13-44", VNSY-14-32" (sidewall), VNSY-15-36", VNSY-31-36", VNSY-32-26", VNSY-33-22", VNSY-34-16" (sidewall), and VNSY-35-14" (sidewall). Samples were analyzed for lead. Samples VNSY-07 through VNSY-10 were also analyzed for VOCs and SVOCs, in accordance with the approved RAWPA (Table 20).

Excavation verification samples were also collected for soil removed immediately adjacent to the Fewless Creek culvert. These samples included: VNSY-16-25" (sidewall), VNSY-17-54", VNSY-18-53", VNSY-19-22" (sidewall), VNSY-19B-22", VNSY-21-70" (sidewall), VNSY-22-28" (sidewall), VNSY-24-76", VNSY-25-52", VNSY-26B-44", VNSY-28-51" VNSY-29-60", VNSY-30-16". These samples were submitted to STL North Canton for analysis of total lead.

Copies of these data results were submitted to U.S. EPA in a letter report to Matt Ohil dated May 3, 2004.

Additional areas adjacent to the Fewless Creek culvert were excavated at the locations of eight previous soil borings where total lead concentrations greater than 400 mg/kg were encountered. Accordingly, soil was removed from the former location of soil borings SB-FCC-19, SB-FCC-30, SB-FCC-33, SB-FCC-35, SB-FCC-36, SB-FCC-37, SB-FCC-38, and SB-FCC-41, and confirmed by collected verification samples: VNFCC-19-58", VNFCC-30-90", VNFCC-35-86", VNFCC-36-100", VNFCC-37-98", VNFCC-38-94", and VNFCC-41-36", respectively. These samples were submitted to STL North Canton for analysis of total lead. Copies of these data results were submitted to U.S. EPA in a letter report to Matt Ohl dated May 3, 2004.

Another location adjacent to the Fewless Creek culvert where total lead concentrations greater than 400 mg/kg were previously detected was at the location of sediment sample VCD-12-0.5" (See Section 4.6.3). Accordingly, soil was removed from this area and a verification soil sample (VNVCD-12-56") was collected and submitted to STL for total lead analysis.

A summary of laboratory results from verification soil samples in the South Yard Area is provided in Table 25.

Upon remediation verification, restoration activities were performed (i.e., backfilling) in accordance with the procedures in Section 4.12 (Restoration of On-Site Areas) of the approved RAWPA and the area was restored to exterior concrete.

Excavated soils were stockpiled in the mixing cells prior to stabilization for lead. Stockpiles 46 and 47, Stockpile 56, and Stockpiles 59 through 64 each contained approximately 220 tons of impacted soil from the southern portion of the South Yard Area.

After mixing of the lead-impacted stockpiles, four characterization samples (Batch 46 through Batch 47) were collected and submitted to STL for analysis of TCLP lead and paint filter. In addition, a characterization sample from Stockpile 59 was also analyzed for TCLP metals, total

VOCs, TCLP carbon disulfide, total SVOCs, and total PCBs. As shown in Table 4, characterization data indicated that UTS was not exceeded. As a result, Stockpiles 46 through 59 were transported offsite for disposal to Adrian Landfill.

4.7.8.3 Fewless Creek Sediment Removal

Sediment within the Fewless Creek culvert was removed beginning on September 29, 2004 and completed on October 8, 2004. Sediment removal from the Fewless Creek culvert was performed in accordance with the approved procedures discussed in Section 4.6 (Preparation and Temporary Facilities – Fewless Creek) and Section 4.7 (Excavation and Staging of Creek Sediment and Bank Soil) of the RAWP dated October 29, 1999

Sediment removal activities began by cutting access holes in the top of the Fewless Creek culvert in several locations to allow for increased access to the culvert. Access holes were located at the westernmost extent of the culvert at the western end of the Site, directly west of the compressor room in the West Employee Parking Lot, in the South Yard, and at one location in the eastern portion of the culvert (i.e., corrugated metal pipe [CMP] portion of the culvert).

Subsequently, water was diverted in the pipe by damming the creek at the western edge of the property using sand bags and pumping water using a 6-inch diesel driven automatic priming pump. Water was pumped through above ground temporary piping to a downstream location. Silt fences were installed at the eastern end of the culvert to prevent sediment from flowing further downstream during the removal process.

A vacuum truck equipped with a 27-inch diameter hose was used to remove sediment from the culvert starting at the western (upstream) end of the culvert and working east (downstream). When the truck was filled with sediment, the sediment was mixed in the onsite treatment cell with excavated soils from other portions of the Site. The sediment removal process was continued until visible sediment was removed from the culvert to the extent practicable (this approach was verbally approved by U.S. EPA in telephone conversations with CEC on September 27, 2004 and October 6, 2004). Removed sediments were mixed with excavated soil from the South Yard Area in Stockpile 63, characterized as described in Section 4.7.8.2, and transported offsite for disposal at Adrian Landfill.

Upon completion of sediment removal, the culvert access holes were sealed by replacing the cut-out concrete plug and grouting into place (for the concrete portion of the culvert) and placing a section of CMP over the hole and bolting it into place (for the CMP portion of the culvert). The areas were then restored to pre-working conditions.

Work inside the culvert was performed by workers trained for confined space entry. A confined space monitor was used during the culvert work. Prior to working inside the culvert, air quality in the culvert was characterized by a trained QA/QC technician.

Upon completion of sediment removal activities, a structural integrity survey was performed by videotaping the culvert interior. A tape measure was used throughout the length of the culvert to serve as a location reference point for the structural integrity survey. Overall, the Fewless Creek culvert was in good condition. The concrete portion of the pipe was in good to excellent condition with no discernable integrity breaches. The downstream, corrugated, portion of the culvert was in fair to good condition with a few areas of deformation due to aboveground weight-loading.

Following completion of the structural integrity survey, the surface water dam at the western end of the culvert was removed to restore creek flow and the water-diverting pump and piping was dismantled.

4.7.8.4 Former B-7 UST Removal

The UST present in the former footprint of Building B-7 was removed in accordance with Ohio Bureau of Underground Storage Tank Regulations (BUSTR). Since the tank contents were unknown, and no information was available from EPI or BBC, a sample of the tank contents was collected on August 10, 2004, and submitted to STL North Canton for analysis of VOCs, SVOCs, PCBs, TCLP metals, reactivity, corrosivity, and ignitibility.

Upon receipt of the laboratory analytical data, the B-7 tank contents were evacuated on October 11, 2004. Evacuation services were provided by Environmental Remediation Services. Approximately 950 gallons of oily material was pumped and transported under manifest to BFI Vienna Junction in Erie, Michigan for disposal.

The tank was removed from the ground on October 23, 2004. During removal, the 1,000-gallon tank was observed to be in good condition, and no holes or leaks were observed. On October 27, 2004, approximately 15 cubic yards of visually impacted soils were removed. The impacted soils were handled and disposed in accordance with approved scope of work associated with the ongoing Removal Action. Verification soil samples (VNB7-01-62" and VNB7-02-62") were collected after soil removal from the base of the excavation per BUSTR guidance. These samples were submitted to STL North Canton for analysis of VOCs, SVOCs, metals, and PCBs. Based on these data, no further action was necessary regarding the former B7 tank removal (Table 11). A UST Closure Report was submitted to BUSTR on January 11, 2005. Additional information was submitted to BUSTR on May 31, 2005.

4.7.9 Phase 9 Activities

Phase 9 activities include site restoration, close out, and demobilization activities. However, due to the pending approval by U.S. EPA for deed restrictions on the property, and due to the discovery of organics impact in Building A-3 and the South Yard Area, RA close-out was not completed. ENTACT, however, completed scheduled restoration activities in November 2004, and demobilized from the Site pending U.S. EPA approval for no further action in proposed deed restricted areas.

4.8 ADDITIONAL ENVIRONMENTAL INVESTIGATIONS - 2004 AND 2005

Due to the discovery of impacted soil beneath Building A-3 and the South Yard Area, additional soil sampling was performed at the Site in 2004 and 2005. As discussed in a letter to U.S. EPA dated July 9, 2004, the purpose of the additional sampling was to further evaluate the horizontal and vertical extent of volatile organic compounds (VOCs) in soils believed to be associated with the buried concrete vault uncovered during removal action activities in the SYA of the Site. As discussed in Section 4.7.8.2, the presence of the buried concrete vault was unanticipated and previously unknown to facility personnel.

Analysis of light non-aqueous phase liquid (LNAPL) and water in the buried concrete vault indicated the presence of some VOCs, semi-VOCs (SVOCs), and polychlorinated biphenyls (PCBs). Subsequent removal action activities in the SYA encountered the presence of VOCs in soil in the vicinity and south of the buried concrete vault. Although the nature and concentration of constituents in the vault had been identified, the extent of impact was not known. The additional sampling was undertaken to provide EPI and BBC with a better understanding of the potential extent and effort required to address organic-impacted soils during the ongoing removal action.

Initial soil sampling activities were performed July 21 through 30, 2004. Sampling activities, procedures, and results are discussed in a report submitted to U.S. EPA, and dated September 21, 2004. In short, 23 soil borings were advanced in and adjacent to Buildings A-2, A-3, A-4, and A-5, and the South Yard Area. Samples were submitted for analysis of VOCs and SVOCs. Sample results are summarized in Table 26.

Based on these data, the subsurface soil impact by VOCs is present in the southwestern portion of the SYA and primarily beneath Building A-3. The impacted area is generally confined to a narrow east-west zone approximately 20 to 30 feet wide and 8 to 12 feet bgs.

4.9 PROPOSED VOC REMEDIATION – BUILDING A-4 AND SOUTH YARD AREA – 2005

On November 22, 2004, CEC submitted a work plan to the U.S EPA for Vertical Delineation and Pilot Testing for VOCs in the SYA. The purpose of the proposed work was to confirm the vertical extent of VOCs in soil immediately east of and beneath Building A-3 and to provide a scope of services associated with the design and pilot testing of soil vapor extraction to remediate the VOCs.

On December 10, 2004, U.S. EPA provided comments to the work plan requested additional detail to the proposed investigative and remedial testing. CEC submitted a revised work plan on January 20, 2005. U.S. EPA provided additional comments to the proposed work plan in a letter dated February 23, 2005. CEC then submitted a response to comments and a revised work plan to U.S. EPA on March 9, 2005.

The revised work plan was under review by U.S. EPA when EPI declared bankruptcy on April 11, 2005. As a result, EPI did not proceed with implementation of the vertical delineation and pilot testing.

In the Fall of 2005, U.S. EPA informed Bunting that as a result of EPI's bankruptcy, Bunting must implement the vertical delineation and pilot testing proposed by EPI. Since Bunting was a signatory to the Order, it declined. Bunting subsequently informed U.S. EPA that Bunting was not supportive of the work proposed by EPI, and that it was Bunting's desire to address the VOCs in the SYA via the expansion of proposed environmental covenants to the property deed. U.S. EPA requested that additional soil investigation and a human health risk assessment be performed in the SYA in order to evaluate whether the VOCs could be left in place.

4.10 SOIL SAMPLING AND ANALYSIS – BUILDING A-4 AND SOUTH YARD AREA – 2006

On behalf of Bunting, Tetra Tech EM, Inc. (TTEMI) submitted a RAWPA to U.S. EPA dated January 6, 2006, to further evaluate the vertical extent of VOCs in the SYA. The RAWPA was approved by U.S. EPA on January 18, 2006. Field sampling activities were performed on February 21 and 22, 2006.

Soil sampling and analysis activities indicated that the concentration and distribution of VOCs in the SYA were consistent with the soil data measured during previous Site investigations.

Accordingly, the 2006 sampling indicated that the distribution of TCE in soil from the 6- to 12-foot depth interval beneath Plant No. 2, Building A-4, and the SYA was well defined in an east-west linear area approximately 40 feet by 115 feet. Consistent with results from previous investigations, TCE was most concentrated (13 mg/kg) immediately northeast of Building A-4 in the vicinity of soil boring GB-17. These data were reported to U.S. EPA on April 7, 2006. Based on these results, Bunting proposed to leave the VOCs in place and to evaluate potential environmental risk to human health.

4.11 HUMAN HEALTH RISK ASSESSMENT - 2007

On June 12, 2006, TTEMI submitted a document entitled *Scope of Work, Human Health Risk Assessment (HHRA), Bunting Bearings, LLC Site, Delta, Fulton County, Ohio* to U.S. EPA. On June 20, 2006, U.S. EPA submitted comments on the Scope of Work. TTEMI prepared a response to comments and a revised Scope of Work and submitted these documents to U.S. EPA on July 19, 2006. U.S. EPA verbally approved the Scope of Work and requested that the HHRA be prepared as planned.

The HHRA was prepared and submitted to U.S. EPA on October 16, 2006. Comments on the HHRA were received from U.S. EPA in a letter dated November 17, 2006. The final HHRA was approved by U.S. EPA in February 2007.

Risks associated with potential exposure to adult industrial workers exposed via inhalation to VOCs in indoor air were evaluated for each of the Site buildings near the VOC area under both Reasonable Maximum Exposure (RME) and Central Tendency Exposure (CTE) conditions. The HHRA concluded that total risks associated with potential exposures to industrial workers are at acceptable EPA levels. Risks associated with potential exposure to adult construction/excavation workers exposed via inhalation of VOCs in the air inside a construction trench were within the U.S. EPA's acceptable range.

4.12 ENVIRONMENTAL COVENANTS - 2008

An *Agreement and Declaration of Covenants and Restrictions of Use of Certain Real Property* was developed for the Site and approved by the U.S. EPA. The deed restrictions were placed on the title to the Site that prohibit the excavation or disturbance of soils in areas where total lead concentrations in soils exist at greater than 400 mg/kg and less than 1,536 mg/kg, and where VOCs exist in the subsurface of Plant No. 2, Building A-4, Building A-5, and the SYA, except as set forth in a Post Removal Site Control Plan (PRSCP). Each deed restricted area is equipped with concrete flooring or concrete pavement to inhibit exposure to the lead-contaminated and VOC-impacted soils. In addition, the PRSCP addresses annual air monitoring activities to be performed in the VOC Area and semi-annual inspections of the lead-impacted soil areas.

5.0 ESTIMATED TOTAL COST

The estimated total cost of the RA was approximately $5,500,000, not including all legal fees and ongoing requirements under the PRSCP or fees incurred by the U.S EPA and Ohio EPA. This estimated total cost is further subdivided per the following tasks:

- EE/CA - $50,000
- Offsite Removal Action Activities - $200,000
- Onsite Removal Action Activities
  - Remediation Phases 1 through 3 - $600,000
  - Remediation Phases 4 through 6 - $1,800,000
  - Remediation Phases 7 and 8 - $2,700,000
- Additional Investigations and Human Health Risk Assessment - $50,000
- Environmental Covenants including Post Removal Site Control - $50,000

6.0 REFERENCES

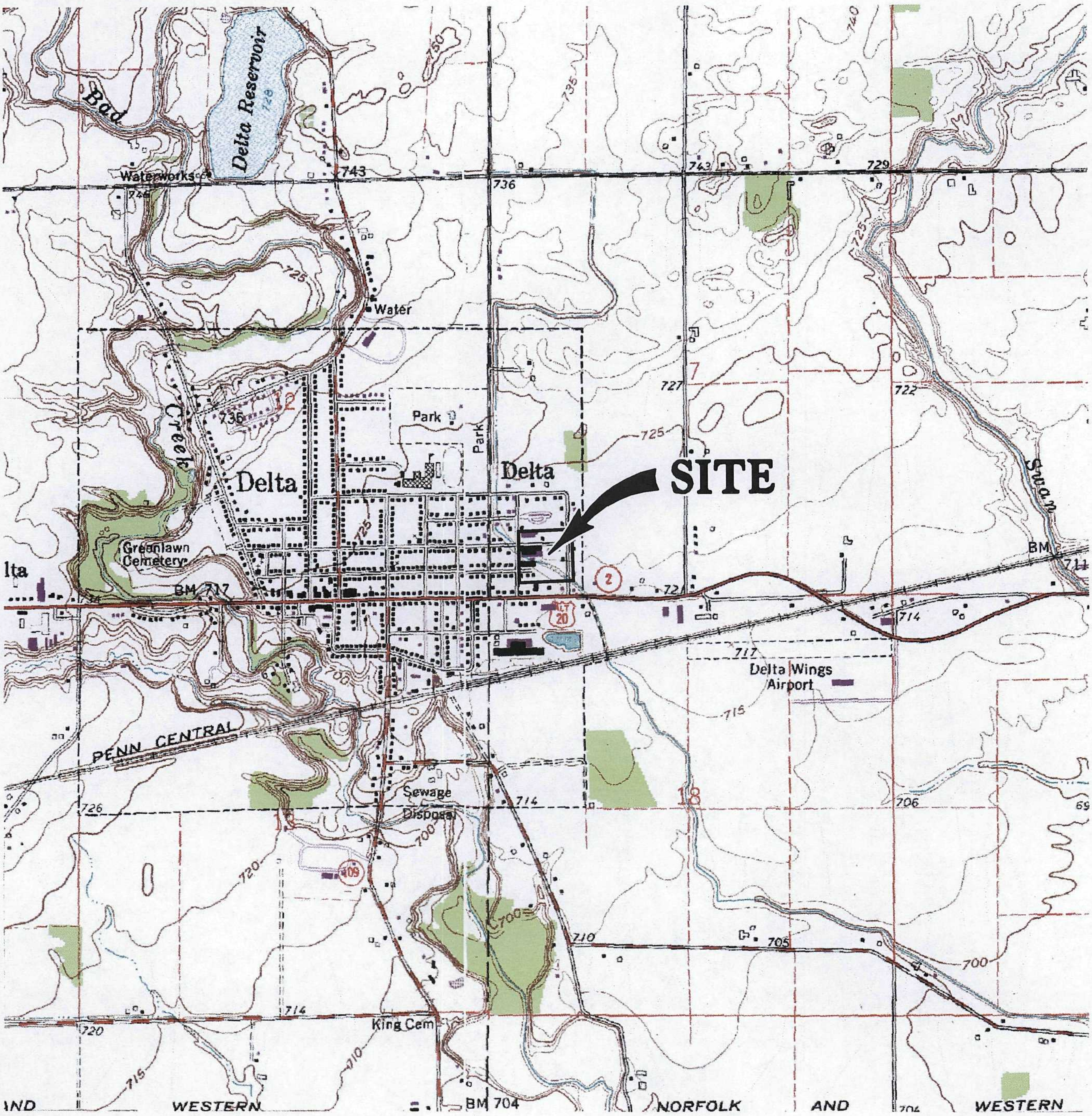
Civil & Environmental Consultants, Inc, 1999, Removal Action Work Plan, Former Eagle-Picher Industries, Delta, Fulton County, Ohio. CEC Project No. 990605.

ENSR, 1998, Site Sampling Plan for the Former Eagle-Picher Site in Delta, Ohio. Document No. 2372-002-400. June 1999.

ENSR, 1999, Engineering Estimate / Cost Analysis for the Former Eagle-Picher Site in Delta, Ohio. Document No. 2372-002-400. June 1999.

U.S. EPA, 1999, Streamlined Risk Evaluation, Former Eagle-Picher Industries, Inc., Delta, Ohio.

FIGURES



1000 500 0 500 1000 2000

SCALE: 1"=2000'

NORTH

QUADRANGLE LOCATION

REFERENCE

1. SOURCE: USGS 7.5 MINUTE QUADRANGLE – SWANTON, OHIO, 1960 PHOTOREVISED 1971.

CEC
Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road - Cincinnati, OH 45242
513-985-0226 · 800-759-5614
www.cecinc.com

FORMER
EAGLE PICHER
INCORPORATED
DELTA, OHIO

SITE LOCATION MAP

DRAWN BY:	TMO	CHECKED BY:	DLC	APPROVED BY:		FIGURE NO.:
DATE:	JAN. 2009	DWG SCALE:	1"=2000'	PROJECT NO:	070-847.0200	1

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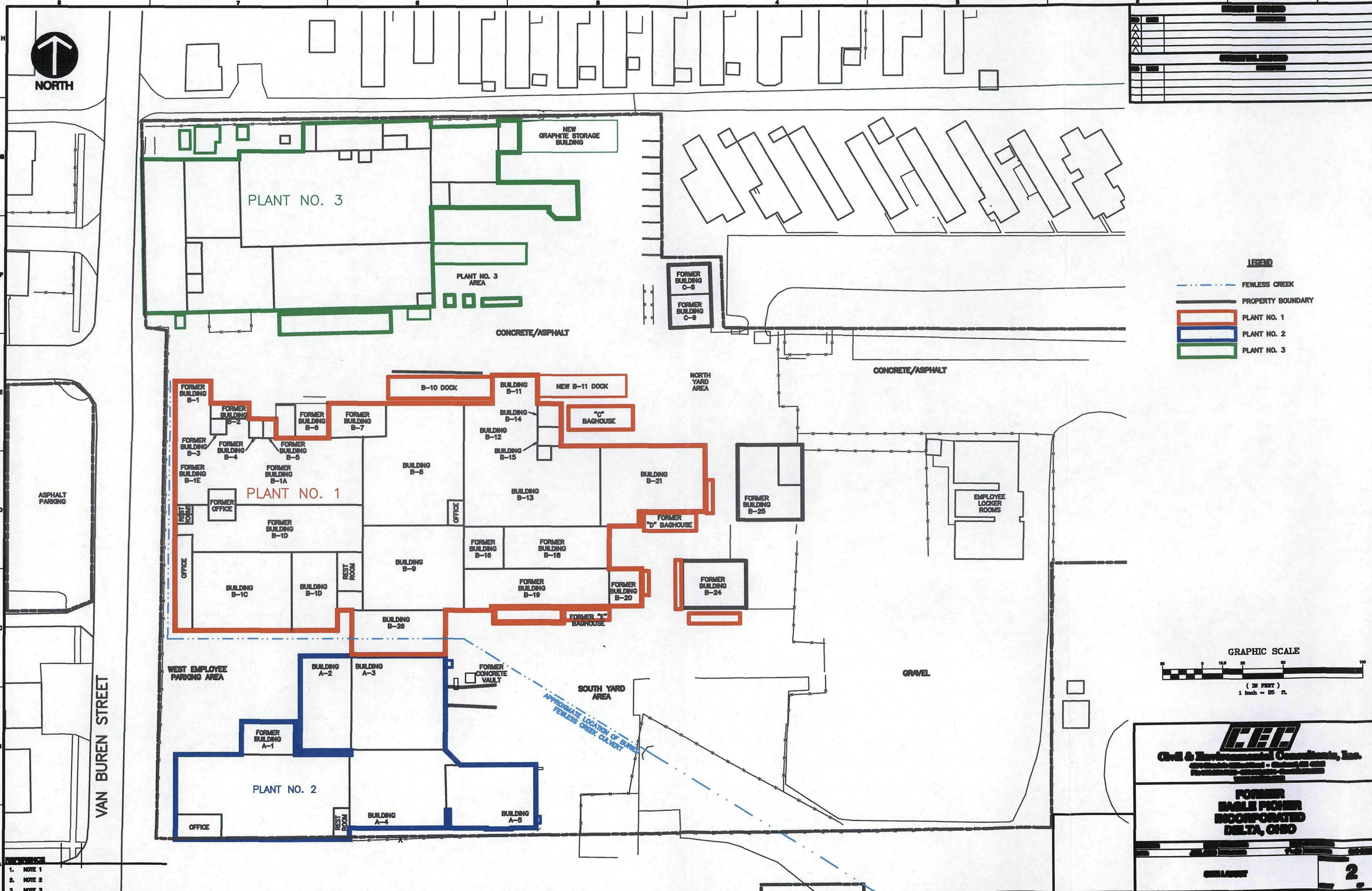
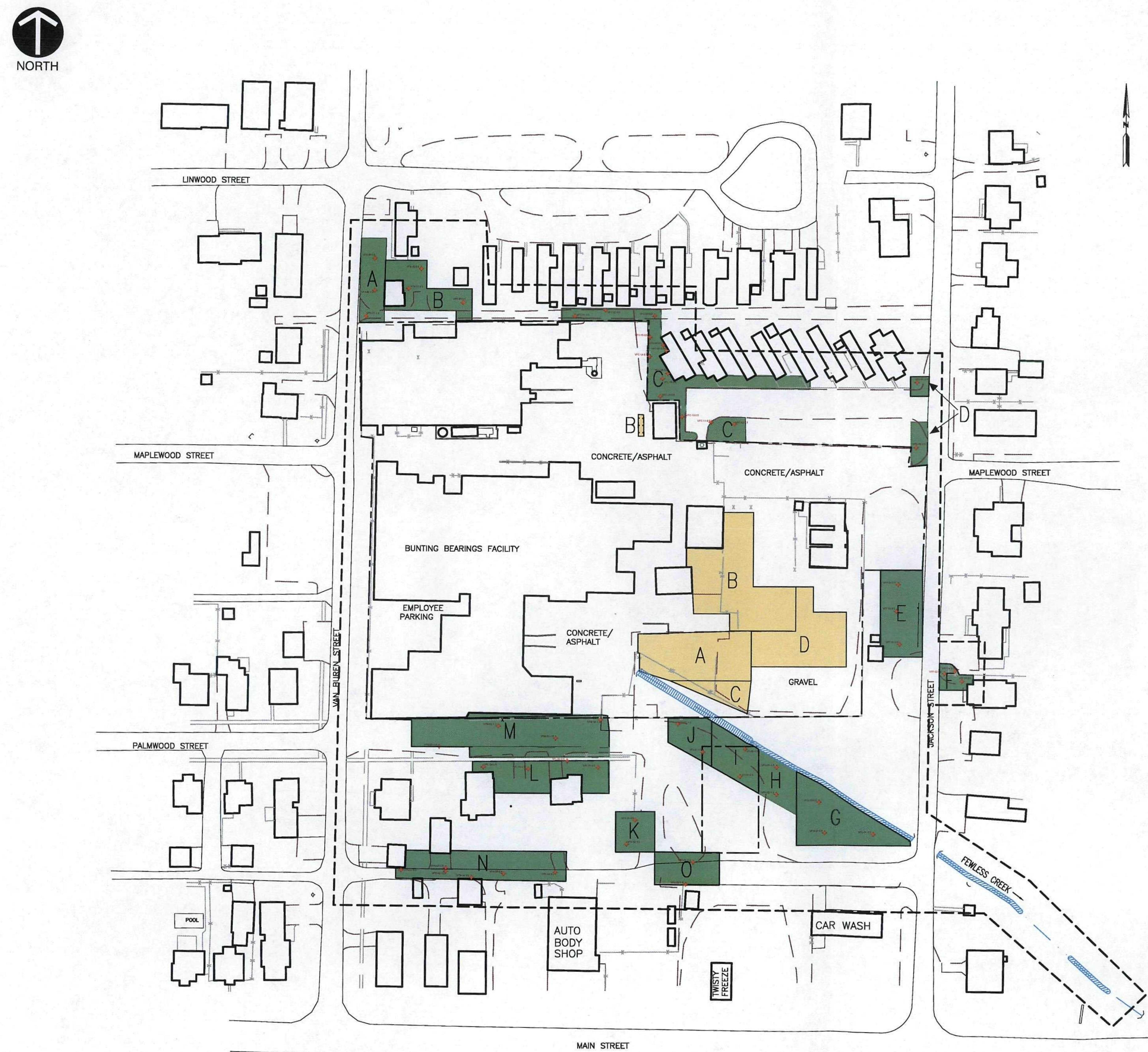

NORTH
VAN BUREN STREET
PLANT NO. 3
NEW GRAPHITE STORAGE BUILDING
PLANT NO. 3 AREA
CONCRETE/ASPHALT
FORMER BUILDING C-8
FORMER BUILDING C-9
NORTH YARD AREA
CONCRETE/ASPHALT
PLANT NO. 1
FORMER BUILDING B-1
FORMER BUILDING B-2
FORMER BUILDING B-3
FORMER BUILDING B-4
FORMER BUILDING B-5
FORMER BUILDING B-6
FORMER BUILDING B-7
FORMER BUILDING B-1E
FORMER BUILDING B-1A
FORMER OFFICE
FORMER BUILDING B-1D
REST ROOM
OFFICE
BUILDING B-1C
BUILDING B-1D
REST ROOM
B-10 DOCK
BUILDING B-11
NEW B-11 DOCK
"C" BAGHOUSE
BUILDING B-14
BUILDING B-12
BUILDING B-15
BUILDING B-8
OFFICE
BUILDING B-13
BUILDING B-21
FORMER "D" BAGHOUSE
BUILDING B-9
FORMER BUILDING B-16
FORMER BUILDING B-18
FORMER BUILDING B-19
FORMER BUILDING B-20
FORMER "E" BAGHOUSE
BUILDING B-26
FORMER BUILDING B-25
FORMER BUILDING B-24
EMPLOYEE LOCKER ROOMS
ASPHALT PARKING
WEST EMPLOYEE PARKING AREA
FORMER CONCRETE VAULT
SOUTH YARD AREA
APPROXIMATE LOCATION OF BURIED FEWLESS CREEK CULVERT
GRAVEL
PLANT NO. 2
BUILDING A-2
BUILDING A-3
FORMER BUILDING A-1
OFFICE
REST ROOM
BUILDING A-4
BUILDING A-5
LEGEND
FEWLESS CREEK
PROPERTY BOUNDARY
PLANT NO. 1
PLANT NO. 2
PLANT NO. 3
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.
CEC
Civil & Environmental Consultants, Inc.
FORMER EAGLE PICHER INCORPORATED DELTA, OHIO
2
REFERENCE
1. NOTE 1
2. NOTE 2
3. NOTE 3

REVISION RECORD

NO	DATE	DESCRIPTION

SUBMITTAL RECORD

NO	DATE	DESCRIPTION



OFF-SITE EXCAVATION AREAS

ID	AREA	AVERAGE DEPTH	VOLUME
A	2060 ft^2	1.5 ft	115 yd^3
B	3595 ft^2	0.5 ft	65 yd^3
C	5890 ft^2	0.5 ft	110 yd^3
D	1145 ft^2	0.5 ft	20 yd^3
E	3470 ft^2	0.5 ft	65 yd^3
F	890 ft^2	0.5 ft	15 yd^3
G	4745 ft^2	0.5 ft	85 yd^3
H	1715 ft^2	1.0 ft	65 yd^3
I	2155 ft^2	0.5 ft	40 yd^3
J	1510 ft^2	1.0 ft	55 yd^3
K	1490 ft^2	0.5 ft	30 yd^3
L	5115 ft^2	0.5 ft	95 yd^3
M	5800 ft^2	1.0 ft	215 yd^3
N	4380 ft^2	0.5 ft	80 yd^3
O	1990 ft^2	1.0 ft	75 yd^3
TOTALS	45950 ft^2	N/A	1130 yd^3

ON-SITE EXCAVATION AREAS

AREA ID	ESTIMATED AREA EXCEEDING 1,500 ppm LEAD (ft^2)	ESTIMATED IMPACTED DEPTH (ft)	ESTIMATED VOLUME OF IMPACTED SOIL (yd^3)
A	5,410	4 to 8	1,600
B	7,650	1.5	425
C	1,370	1.5	75
D	3,940	1.5	220

LEGEND

- FEWLESS CREEK
- PROPERTY BOUNDARY
- AREA OF CONTAMINATION (AOC)
- ON-SITE EXCAVATION AREAS
- OFF-SITE EXCAVATION AREAS
- FEWLESS CREEK BANK SOIL EXCAVATION AREA
- FEWLESS CREEK SEDIMENT EXCAVATION AREA

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

SCALE IN FEET

Civil & Environmental Consultants, Inc.
4274 Glendale-Milford Road - Cincinnati, OH 45242
Ph: 513.985.0226 · 800.759.5614 · Fax: 513.985.0228
www.cecinc.com

FORMER EAGLE PICHER INCORPORATED DELTA, OHIO

DRAWN BY: JK	CHECKED BY: DLC	APPROVED BY:
DATE: JAN. 2009	DWG SCALE: 1"=50'	PROJECT NO: 070-847.0200

REMOVAL ACTION
AREA OF
OFFSITE REMOVAL

DRAWING NO.: 3

TABLES

TABLE 1

FEWLESS CREEK SEDIMENT SAMPLING RESULTS
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO
CEC PROJECT NO. 220931

Parameters	Units	Sample ID	VCD-09-0.5	VCD-10-0.5	VCD-11-0.5	VCD-14-0.5	VCD-12-0.5	VCD-13-0.5	VCD-15-0.5
		Date Collected	9/12/2002	9/12/2002	9/12/2002	9/12/2002	9/19/2002	9/19/2002	10/24/2002
Volatile Organic Compounds									
Vinyl Chloride	mg/kg		<0.015	<0.013	0.0028 J	< 0.012	< 0.013	< 0.030	< 0.012
Methylene Chloride	mg/kg		0.0072 J	0.020	0.009	< 0.006	< 0.0066	< 0.015	< 0.006
Acetone	mg/kg		0.015 J,B	0.013 J,B	0.032 B	0.0074 J,B	0.0067 J,B	0.015 J	< 0.024
Carbon Disulfide	mg/kg		< 0.0073	0.0017 J	< 0.008	< 0.006	< 0.0066	0.0022 J	< 0.006
2-Butanone	mg/kg		0.0038 J,B	0.0033 J,B	0.016 J,B	0.0018 J,B	< 0.026	< 0.061	< 0.024
Trichloroethene	mg/kg		< 0.0073	< 0.0067	0.002 J	< 0.006	< 0.0066	< 0.015	< 0.006
4-Methyl-2-pentanone	mg/kg		< 0.029	< 0.027	< 0.032	< 0.024	< 0.026	0.0033 J	< 0.024
Tetrachloroethene	mg/kg		< 0.0073	< 0.0067	0.0044 J	< 0.006	< 0.0066	< 0.015	< 0.006
Toluene	mg/kg		0.011	< 0.0067	0.025	< 0.006	< 0.0066	< 0.015	< 0.006
Metals (total)									
Lead	mg/kg		210	104	349	12.7	1,700	251	921
PCBs									
Aroclor 1016	mg/kg		< 0.048	< 0.044	< 0.053	< 0.040	< 0.044	< 0.100	< 0.039
Aroclor 1221	mg/kg		< 0.048	< 0.044	< 0.053	< 0.040	< 0.044	< 0.100	< 0.039
Aroclor 1232	mg/kg		< 0.048	< 0.044	< 0.053	< 0.040	< 0.044	< 0.100	< 0.039
Aroclor 1242	mg/kg		0.070	0.050	0.200	< 0.040	0.062	0.130	0.098
Aroclor 1248	mg/kg		< 0.048	< 0.044	< 0.053	< 0.040	< 0.044	< 0.100	< 0.039
Aroclor 1254	mg/kg		0.054	0.039 J	0.340	< 0.040	0.056	0.110	< 0.039
Aroclor 1260	mg/kg		< 0.048	< 0.044	< 0.053	< 0.040	< 0.044	< 0.100	0.076
PAHs									
Acenaphthene	mg/kg		0.32 J	0.28 J	< 0.53	< 0.40	< 0.44	0.22 J	< 0.39
Dibenzofuran	mg/kg		0.20 J	0.15 J	< 0.53	< 0.40	< 0.44	0.22 J	< 0.39
Fluorene	mg/kg		0.48 J	0.38 J	< 0.53	< 0.40	< 0.44	0.52 J	< 0.39
Phenanthrene	mg/kg		4.50	4.20	0.47 J	0.49	0.40 J	5.20	0.50
Anthracene	mg/kg		1.00	0.98	0.084 J	0.087 J	0.063 J	1.30	< 0.39
Carbazole	mg/kg		0.47 J	0.43 J	0.062 J	< 0.40	< 0.44	< 1.00	< 0.39
Fluoranthene	mg/kg		6.40	6.80	0.99	0.78	0.76	7.40	0.69
Pyrene	mg/kg		5.40	5.60	0.90	0.66	0.66	6.00	0.67
Butyl benzyl phthalate	mg/kg		< 0.96	< 0.88	< 0.53	< 0.40	0.056 J	< 1.00	< 0.39
Benzo (a) anthracene	mg/kg		2.40	2.40	0.40 J	0.30 J	0.24 J	2.30	< 0.39
Chrysene	mg/kg		2.70	2.80	0.49 J	0.35 J	0.35 J	2.40	< 0.39
bis (2-Ethylhexyl) phthalate	mg/kg		0.23 J	0.19 J	0.15 J	< 0.40	0.79	0.68 J	< 0.39
Benzo (b) fluoranthene	mg/kg		2.80	3.00	0.49 J	0.37 J	0.35 J	2.30	< 0.39
Benzo (k) fluoranthene	mg/kg		1.10	1.20	0.15 J	0.14 J	0.15 J	1.10	< 0.39
Benzo (a) pyrene	mg/kg		2.10	2.20	0.34 J	0.26 J	0.25 J	1.90	< 0.39
Indeno (1,2,3-cd) pyrene	mg/kg		1.20	1.30	0.18 J	0.14 J	0.12 J	0.86 J	< 0.39
Dibenz (a,h) anthracene	mg/kg		0.37 J	0.35 J	< 0.53	0.043 J	< 0.44	0.22 J	< 0.39
Benzo (ghi) perylene	mg/kg		1.20	1.40	0.20 J	0.14 J	0.14 J	0.88 J	< 0.39

J Estimated result. Result is less than the RL.
B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

TABLE 2

SUMMARY OF SOIL ANALYSES
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO
CEC PROJECT NO. 210252

Sample Location	Sample Identification	Sample Date	Sample Depth (feet below ground surface)	Total Lead[1] (mg/kg)
Building C-10 Area	SB-103 (4-5)	10/2/2001	4 - 5	14.5 (L)
	SB-103 (4-5)-DP	10/2/2001	4 - 5	13.5
	SB-104 (0-1)	10/2/2001	0 - 1	57.7
	SB-105 (2-3)	10/2/2001	2 - 3	11.0
	SB-105 (3-4)	10/2/2001	3 - 4	11.0
	SB-106 (1-2)	10/2/2001	1 - 2	48.8
	SB-107 (1-2)	10/2/2001	1 - 2	22.3
	SB-108 (2-3)	10/2/2001	2 - 3	11.5
	SB-109 (1-2)	10/2/2001	1 - 2	7.6
West Employee Parking Area	SB-110 (1.5-2)	10/2/2001	1.5 - 2	917
	SB-110 (3-4)	10/2/2001	3 - 4	469
	SB-110 (3-4)-DP	10/2/2001	3 - 4	721
	SB-111 (1-2)	10/2/2001	1 - 2	456
	SB-112 (0-1)	10/3/2001	0 - 1	398
	SB-113 (2-3)	10/3/2001	2 - 3	<5.2
	SB-114 (1-2)	10/3/2001	1 - 2	78.7
South Yard Area	SB-115 (5-6)	10/3/2001	5 - 6	4,820
	SB-116 (1-2)	10/3/2001	1 - 2	6.1
	SB-117 (0-1)	10/3/2001	0 - 1	503
	SB-118 (1-2)	10/3/2001	1 - 2	12.8
	SB-119 (0-1)	10/3/2001	0 - 1	1,420
	RB-001*	10/2/2001	---	<0.0030
	RB-002*	10/3/2001	---	<0.0030

* - Rinse blank analytical results reported in mg/L (aqueous sample)

(L) - Serial dilution of a digestate in the analytical batch indicates that physical and chemical interferences are present.

RB - Equipment rinse blank sample

[1] U.S. EPA SW-846 Method 6010

TABLE 3

SUMMARY OF VERIFICATION SAMPLING RESULTS - PLANT NO. 3 AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A2F290147				A2G020189
		Sample ID	VNP3-01-2.0	VNP3-02-2.0	VNP3-03-1.0	VNP3-04-1.0	VNP3-05-6.0
		Date Collected	6/28/2002	6/28/2002	6/28/2002	6/28/2002	7/1/2002
Volatile Organic Compounds							
Acetone	ug/kg		15 J	40	7.7 J	< 31	27
2-Butanone	ug/kg		4.6 J	6.8 J	< 24	< 31	5.0 J
Methylene Chloride	ug/kg		1.8 J	2.8 J	2.5 J	3.2 J	< 5.0
Metals (total)							
Lead	mg/kg		11.9	10.0	11.0	21.6	---
PCBs	ug/kg		< 40	< 40	< 39	< 41	< 39
PAHs							
bis (2-Ethylhexyl) phthalate	ug/kg		< 400	< 400	< 390	< 410	83 J, B

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

Table 4

Waste Disposal - Batch Sample Results
EPI - Delta, OH
220931

Analytical Parameter	STL Lot Number		A2G020177				A2G100132	A2G130117	A2G240135	A2G270127	A2H090181	A2H240148	A2I040135	A2I110230	A2I200181	A3B250216	A3B260135		A3C040143	A3C190189
	Units	Sample ID	Batch-01-1	Batch-01-2	Batch-01-3	Batch-01-C	Batch-01-4	Batch-02-1	Batch 03-1	Batch-04-1	Batch-05-1	Batch-06-1	Batch-07-1	Batch-08-1	Batch 09-1	Batch 10-1	Batch 11-1	Batch 11-D	Batch 12-1	Batch 13-1
			7/1/2002	7/1/2002	7/1/2002	7/1/2002	7/9/2002	7/12/2002	7/23/2002	7/26/2002	8/8/2002	8/23/2002	9/3/2002	9/10/2002	9/18/2002	2/24/2003	2/25/2003	2/25/2003	3/3/2003	3/18/2003
Volatile Organic Compounds																				
Acetone	ug/kg		82	34 J	32 J	---	8 0 J	---	---	---	---	---	---	---	---	66 B	140 J	110 J	---	---
2-Butanone	ug/kg		6 3 J	7.1 J	5.7 J	---	< 44	---	---	---	---	---	---	---	---	10 J	< 1,400	< 1,800	---	---
Chloromethane	ug/kg					---		---	---	---	---	---	---	---	---	1 7 J	< 360	< 450	---	---
1,1-Dichloroethane	ug/kg					---		---	---	---	---	---	---	---	---	0 41 J	< 360	< 450	---	---
Ethylbenzene	ug/kg					---		---	---	---	---	---	---	---	---	1.0 J	< 360	< 450	---	---
Methylene Chloride	ug/kg		< 5.3	< 9.4	< 8.2	---	7 6 J	---	---	---	---	---	---	---	---	< 6.5	< 360	< 450	---	---
1,1,1-Trichloroethane	ug/kg					---		---	---	---	---	---	---	---	---	0.61 J	< 360	< 450	---	---
Trichlorofluoromethane	ug/kg							---	---	---	---	---	---	---	---	< 6.5	47 J	< 450	---	---
Xylenes (Total)	ug/kg					---		---	---	---	---	---	---	---	---	2.0 J	< 720	< 900	---	---
TCLP Carbon Disulfide	mg/L		< 0.025	< 0 025	< 0.025	---	---	---	---	---	---	---	---	---	---	< 0.025	< 0.025	< 0.025	---	---
Other VOCs	ug/kg		< 5.3 - 21	< 4.7 - 37	< 8.2 - 33	---	<5.5 - 44	---	---	---	---	---	---	---	---	< 6.5 - 26	< 360 - 3,600	< 450 - 4,500	---	---
Metals			TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP	TCLP
Antimony	mg/L		0.0053 B	0.0048 B	0.0064 B	0.0061 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	mg/L		0.047 B	0.032 B	0.034 B	0.038 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/L		0.039 B	0.052 B	0.045 B	0.035 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beryllium	mg/L		< 0.0050	< 0.0050	< 0.0050	< 0.0050	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/L		0.021 B	0.0074 B	0.0039 B	0.0046 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/L		0.012 B	0 0082 B	0.011 B	0.010 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/L		0.017 B	0.010 B	0.0059 B	0.0057 B	0 0056 B	0.043 B	0.0048 B	0.028 B	< 0.50	0.0083 B	0.041 B	0.018 B	0.014 B	< 0 50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	mg/L		0.16	0.16	0.16	0.19	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/L		< 0.25	< 0.25	< 0.25	< 0.25	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/L		0.0017 B	< 0.50	< 0.50	< 0.50	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Thallium	mg/L		0.011 B, J	0.011 B, J	0.0081 B, J	0.013 B, J	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/L		0.0046 B	0.0077 B	0.0086 B	0.0071 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/L		0.84 B	0.69 B	0.53 B	0.72 B	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/L		< 0 0020	< 0.0020	< 0.0020	< 0.0020	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCBs																				
Aroclor 1016	ug/kg		< 38	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1221	ug/kg		< 38	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1232	ug/kg		< 38	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1242	ug/kg		39	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1248	ug/kg		< 38	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1254	ug/kg		< 38	32 J	24 J	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Aroclor 1260	ug/kg		< 38	< 38	< 37	---	< 38	---	---	---	---	---	---	---	---	< 39	< 39	< 39	---	---
Paint Filter Test			---	---	---	NEG	---	---	---	---	---	---	---	NEG	NEG	NEG	NEG	NEG	NEG	NEG
PAHs																				
Acenaphthene	ug/kg		< 380	160 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	83 J	74 J	---	---
Anthracene	ug/kg		< 380	83 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	71 J	82 J	---	---
Benzo(a)anthracene	ug/kg		< 380	45 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	< 980	< 980	---	---
Benzo(a)pyrene	ug/kg		< 380	59 J	79 J	---	< 380	---	---	---	---	---	---	---	---	< 970	58 J	45 J	---	---
Benzo(b)fluoranthene	ug/kg		51 J	91 J	58 J	---	< 380	---	---	---	---	---	---	---	---	< 970	84 J	86 J	---	---
Benzo(g,h,i)perylene	ug/kg		< 380	42 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	< 980	51 J	---	---
Benzo(k)fluoranthene	ug/kg		47 J	97 J	52 J	---	< 380	---	---	---	---	---	---	---	---	< 970	< 980	< 980	---	---
Indeno (1,2,3-cd) pyrene	ug/kg																			
bis (2-Ethylhexyl) phthalate	ug/kg		190 J,B	< 380	140 J,B	---	< 380	---	---	---	---	---	---	---	---	89 J	73 J	110 J	---	---
Butyl benzyl phthalate	ug/kg		< 380	< 380	180 J	---	< 380									< 970	< 980	< 980		
Chrysene	ug/kg		58 J	89 J	57 J	---	< 380	---	---	---	---	---	---	---	---	< 970	73 J	130 J	---	---
2,4-Dimethylphenol	ug/kg		< 380	86 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	< 980	< 980	---	---
Fluoranthene	ug/kg		< 380	47 J	< 370	---	< 380	---	---	---	---	---	---	---	---	< 970	72 J	71 J	---	---
Fluorene	ug/kg		76 J	350 J	57 J	---	< 380	---	---	---	---	---	---	---	---	< 970	150 J	140 J	---	---
2-Methylnaphthalene	ug/kg		300 J	2400	190 J	---	< 380	---	---	---	---	---	---	---	---	930 J	2,200	2,300	---	---
Napthalene	ug/kg		42 J	220 J	< 370	---	< 380	---	---	---	---	---	---	---	---	150 J	450 J	710 J	---	---
Phenol	ug/kg																			
Phenanthrene	ug/kg		210 J	960	180 J	---	< 380	---	---	---	---	---	---	---	---	170 J	450 J	600 J	---	---
Pyrene	ug/kg		52 J	110 J	54 J	---	< 380	---	---	---	---	---	---	---	---	< 970	160 J	160 J	---	---

B Estimated result. Result is less than the RL. (Metals only)
J Method Blank Contamination. The associated method blank contains the target analyte at a reportable level. (Metals only)

Table 4

Waste Disposal - Batch Sample Results
EPI - Delta, OH
220931

Analytical Parameter	STL Lot Number		A3C200136	A3D090159	A3D100171	A3D160125	A3D170123 & A3D250240	A3F250198		A4B200186		A4B210110		A4B270125	A4B280159	A4C050110	A4C190165	A4C240127	A4C250113
	Units	Sample ID	Batch 14-1	Batch 15-1	Batch 16-1	Batch 17-1	Batch 18-1	Batch 19	Batch 19D	Batch20	Batch 21	Batch 22	Batch 23	Batch 24	Batch 25	Batch 26	Batch 27	Batch 28	Batch 29
			3/19/2003	4/8/2003	4/9/2003	4/15/2003	4/16/2003 & 4/24/03	6/24/2003	6/24/2003	2/19/2004	2/19/2004	2/20/2004	2/20/2004	2/26/2004	2/27/2004	3/4/2004	3/18/2004	3/23/2004	3/24/2004
Volatile Organic Compounds																			
Acetone	ug/kg		---	---	---	---	32 J,B	---	---	---	---	---	---	---	---	---	---	---	---
2-Butanone	ug/kg		---	---	---	---	< 79	---	---	---	---	---	---	---	---	---	---	---	---
Chloromethane	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
1,1-Dichloroethane	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
Methylene Chloride	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
Trichlorofluoromethane	ug/kg		---	---	---	---	< 20	---	---	---	---	---	---	---	---	---	---	---	---
Xylenes (Total)	ug/kg		---	---	---	---	< 39	---	---	---	---	---	---	---	---	---	---	---	---
TCLP Carbon Disulfide	mg/L		---	---	---	---	< 0.025	---	---	---	---	---	---	---	---	---	---	---	---
Other VOCs	ug/kg		---	---	---	---		---	---	---	---	---	---	---	---	---	---	---	---
Metals			TCLP	TCLP	TCLP	TCLP	TCLP												
Antimony	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beryllium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/L		< 0.50	< 0.50 E	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Thallium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCBs																			
Aroclor 1016	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1221	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1232	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1242	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1248	ug/kg		---	---	---	---	51	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1254	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Aroclor 1260	ug/kg		---	---	---	---	< 44	---	---	---	---	---	---	---	---	---	---	---	---
Paint Filter Test			NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
PAHs																			
Acenaphthene	ug/kg		---	---	---	---	380 J	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Anthracene	ug/kg		---	---	---	---	190 J	---	---	---	---	---	---	---	---	---	---	< 2600	52 J
Benzo(a)anthracene	ug/kg		---	---	---	---	45 J	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Benzo(a)pyrene	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Benzo(b)fluoranthene	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	35 J
Benzo(g,h,i)perylene	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Benzo(k)fluoranthene	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Indeno (1,2,3-cd) pyrene	ug/kg																	< 2600	76 J
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	26 J	---	---	---	---	---	---	---	---	---	---	< 2600	94 J
Butyl benzyl phthalate	ug/kg						< 440											< 2600	< 390
Chrysene	ug/kg		---	---	---	---	54 J	---	---	---	---	---	---	---	---	---	---	< 2600	30 J
2,4-Dimethylphenol	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Fluoranthene	ug/kg		---	---	---	---	92 J	---	---	---	---	---	---	---	---	---	---	< 2600	78 J
Fluorene	ug/kg		---	---	---	---	510	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
2-Methylnaphthalene	ug/kg		---	---	---	---	960	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Napthalene	ug/kg		---	---	---	---	< 440	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Phenol	ug/kg						40 J											< 2600	< 390
Phenanthrene	ug/kg		---	---	---	---	1,700	---	---	---	---	---	---	---	---	---	---	< 2600	< 390
Pyrene	ug/kg		---	---	---	---	250 J	---	---	---	---	---	---	---	---	---	---	< 2600	27 J

B Estimated result. Result is less than the RL. (Metals only)
J Method Blank Contamination. The associated method blank contains the target analyte at a reportable level (Metals only)

Table 4

Waste Disposal - Batch Sample Results
EPI - Delta, OH
220931

Analytical Parameter	STL Lot Number		A4C260140	A4D010147	A4D020170		A4D070147			A4D100116		A4D140134	A4D200216	A4D220146	A4E070245	A4E010130	A4E120142	A4E130142	A4E200189	A4F050118
	Units	Sample ID	Batch 30 3/25/2004	Batch 31 3/31/2004	Batch 32 4/1/2004	Batch 33 4/1/2004	B-25 CHIP1 4/5/2004	B-25 CHIP2 4/5/2004	B-25 CHIP3 4/6/2004	Batch 34	Batch 35	Batch 36 4/13/2004	Batch 37 4/19/2004	Batch 38 4/21/2004	Batch 39 5/6/2004	Batch 40 4/30/2004	Batch 41 5/11/2004	Batch 42 5/12/2004	Batch 43 5/19/2004	Batch 44 6/4/2004
Volatile Organic Compounds																				
Acetone	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Butanone	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloromethane	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1-Dichloroethane	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methylene Chloride	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Trichlorofluoromethane	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Xylenes (Total)	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TCLP Carbon Disulfide	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Other VOCs	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Metals																				
Antimony	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Arsenic	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Beryllium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/L		< 0.50	< 0.50	< 0.50	< 0.50	---	---	---	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Nickel	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Thallium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vanadium	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Zinc	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury	mg/L		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCBs																				
Aroclor 1016	ug/kg		---	---	---	---	< 34	< 35	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1221	ug/kg		---	---	---	---	< 34	< 35	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1232	ug/kg		---	---	---	---	< 34	< 35	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1242	ug/kg		---	---	---	---	< 34	< 35	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1248	ug/kg		---	---	---	---	220	110	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1254	ug/kg		---	---	---	---	< 34	< 35	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Aroclor 1260	ug/kg		---	---	---	---	100	88	< 34	---	---	---	< 39	< 38	< 42	---	---	---	---	---
Paint Filter Test			NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG	NEG
PAHs																				
Acenaphthene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Anthracene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(a)anthracene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(b)fluoranthene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(g,h,i)perylene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Indeno (1,2,3-cd) pyrene	ug/kg																			
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Butyl benzyl phthalate	*ug/kg*																			
Chrysene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2,4-Dimethylphenol	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fluoranthene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fluorene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2-Methylnaphthalene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Napthalene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Phenol	ug/kg																			
Phenanthrene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pyrene	ug/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

B Estimated result. Result is less than the RL. (Metals only)
J Method Blank Contamination. The associated method blank contains the target analyte at a reportable level. (Metals only)

TABLE 5
SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-5
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A2G160110						A2G240133	
		Sample ID	VNA5-01-4.2	VNA5-02-4.2	VNA5-03-4.2	VNA5-04-4.2	VNA5-05-4.2	VNA5-06-4.2	VNA5-03-4.2R	VNA5-06-4.2R
		Date Collected	7/15/2002	7/15/2002	7/15/2002	7/15/2002	7/15/2002	7/15/2002	7/23/2002	7/23/2002
Volatile Organic Compounds										
Acetone	ug/kg		61 B	---	---	---	---	---	---	---
2-Butanone	ug/kg		15 J	---	---	---	---	---	---	---
Methylene Chloride	ug/kg		5.9 J, B	---	---	---	---	---	---	---
Metals (total)										
Lead	mg/kg		290	46.9	3,140	52.2	58.1	2,420	26.8	320 E
PCBs	ug/kg		< 45	---	---	---	---	---	---	
PAHs	ug/kg		< 450 - 2,200	---	---	---	---	---	---	

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 6

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-4
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number		A2H090165						
	Units	Sample ID	VNA4-01-4.0	VNA4-02-4.0	VNA4-03-4.0	VNA4-04-4.0	VNA4-05-4.0	VNA4-06-4.0	VNA4-07-4.0
		Date Collected	8/8/2002	8/8/2002	8/8/2002	8/8/2002	8/8/2002	8/8/2002	8/8/2002
Metals (total)									
Lead	mg/kg		12.6	11.5	10.9	81.6	21.6	481	82.2

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 6

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-4
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A2H140129	A2I140124			
		Sample ID	VNA4-06-2.OR	VNA4-08-4.15	VNA4-09-4.15	VNA4-10-4.15	VNA4-11-2.0
		Date Collected	8/13/2002	9/13/2002	9/13/2002	9/13/2002	9/13/2002
Metals (total)							
Lead	mg/kg		18.7	12.6	14.5	13.9	163

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 7

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-3
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A2I190104								
		Sample ID	VNA3-01-4.15	VNA3-02-4.15	VNA3-03-4.15	VNA3-04-2.5	VNA3-05-4.15	VNA3-06-4.15	VNA3-07-4.15	VNA3-08-4.15	VNA3-06-4.15
		Date Collected	9/18/2002	9/18/2002	9/18/2002	9/18/2002	9/18/2002	9/18/2002	9/18/2002	9/18/2002	6/20/2003
Volatile Organic Compounds											
Acetone	ug/kg		---	---	---	---	---	---	---	---	2300 J
1,2-Dichloroethene (total)	ug/kg		---	---	---	---	---	---	---	---	9900
Ethylbenzene	ug/kg		---	---	---	---	---	---	---	---	290 J
Toluene	ug/kg		---	---	---	---	---	---	---	---	350 J,B
Trichloroethene	ug/kg		---	---	---	---	---	---	---	---	110000
Xylenes (total)	ug/kg		---	---	---	---	---	---	---	---	1000 J
Metals (total)											
Lead	mg/kg		12.0	93.1	17.2	163	12.3	108	12.8	94.5	---
PAHs											
1,2-Dichlorobenzene			---	---	---	---	---	---	---	---	66 J
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---	---	---	---	32 J

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 8
SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-2 AND A-3
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

PARAMETER	UNITS	Building A2 VNA2-03-3.75 6/20/2003	Building A3 VNA3-06-4.15 6/20/2003
Volatile Organic Compounds			
Acetone	mg/kg	0.0098 J	2.3 J
1,1-Dichloroethane	mg/kg	0.0033 J	< 4.4
1,1-Dichloroethene	mg/kg	0.0022 J	< 4.4
1,2-Dichloroethene (total)	mg/kg	0.21	9.9
Ethylbenzene	mg/kg	<0.0089	0.29 J
Toluene	mg/kg	0.0015 J	0.350 J,B
Trichloroethene	mg/kg	0.0056 J	110
Vinyl chloride	mg/kg	0.08	< 4.4
Xylenes (total)	mg/kg	<0.018	1 J
Semi-Volatile Organic Compounds			
1,2-Dichlorobenzene	mg/kg	NA	0.066 J
bis (2-Ethylhexyl) phthalate	mg/kg	NA	0.032 J
Metals (total)			
Lead	mg/kg	36.7	NA

J Estimated result. Result is less than the RL.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

NA Not Analyzed

TABLE 9

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING A-2
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A2H300162							
		Sample ID	VNA2-01-3.75	VNA2D-01-3.75	VNA2-02-3.75	VNA2-03-1.5	VNA2-04-3.75	VNA2-05-2.0	VNA2-06-2.0	VNA2-02-3.75
		Date Collected	8/27/2002	8/27/2002	8/27/2002	8/28/2002	8/29/2002	8/27/2002	8/27/2002	6/20/2003
Volatile Organic Compounds										
Acetone	ug/kg		---	---	---	---	---	---	---	9.8 J
1,1-Dichloroethane	ug/kg		---	---	---	---	---	---	---	3.3 J
1,2-Dichloroethene (total)	ug/kg		---	---	---	---	---	---	---	2.2 J
1,1-Dichloroethene	ug/kg		---	---	---	---	---	---	---	210
Toluene	ug/kg		---	---	---	---	---	---	---	1.5 J
Trichloroethene	ug/kg		---	---	---	---	---	---	---	5.6 J
Vinyl chloride	ug/kg		---	---	---	---	---	---	---	80
Metals (total)										
Lead	mg/kg		20.4	17.4	21.0	36.7	12.8	43.3	87.5	---
PAHs										
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---	---	---	53 J

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 10

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-8
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A3C040200	A3C050127		A3C130140					
		Sample ID	VNB8-07-2.0	VNB8-08-2.0	VNB8-09-2.0	VNB8-01-2.5	VNB8-01D-2.5	VNB8-02-2.5	VNB8-03-2.0	VNB8-04-2.5	VNB8-05-2.5
		Date Collected	3/3/2003	3/4/2003	3/4/2003	3/12/2003	3/12/2003	3/12/2003	3/12/2003	3/14/2003	3/14/2003
Volatile Organic Compounds											
Acetone	ug/kg		< 49	< 34	< 32	490 J,B	370 J,B	38 B	55 B	43	21 J
Benzene	ug/kg		< 12	< 8.5	< 8.1	< 510	< 360	< 6.5	< 6.4	< 5.9	< 7.0
2-Butanone	ug/kg		< 49	< 34	< 32	< 2,000	100 J	6.9 J,B	9.4 J,B	6.1 J	3.3 J
Carbon disulfide	ug/kg		< 12	< 8.5	< 8.1	< 510	< 360	< 6.5	< 6.4	0.37 J	< 7.0
Methylene Chloride	ug/kg		< 12	< 8.5	< 8.1	180 J,B	130 J,B	4.6 J,B	4.4 J,B	< 5.9	3.4 J,B
Toluene	ug/kg		< 12	< 8.5	< 8.1	< 510	< 360	< 6.5	< 6.4	0.36 J	< 7.0
Metals (total)											
Lead	mg/kg		17.7	10.6	10.8	14.8	15.1	30.2	14.0	181	15.0
PAHs											
Naphthalene	ug/kg		< 400	< 390	< 410	680 J	360 J	47 J	< 380	< 380	< 400
2-Methylnaphthalene	ug/kg		< 400	< 390	< 410	5,900	3,100	64 J	< 380	< 380	< 400
Acenaphthene	ug/kg		< 400	< 390	< 410	250 J	120 J	< 370	< 380	< 380	< 400
Fluorene	ug/kg		< 400	< 390	< 410	510 J	270 J	< 370	< 380	< 380	< 400
Phenanthrene	ug/kg		< 400	< 390	< 410	610 J	370 J	< 370	< 380	< 380	< 400
Anthracene	ug/kg		< 400	< 390	< 410	110 J	50 J	< 370	< 380	< 380	< 400
bis (2-Ethylhexyl) phthalate	ug/kg		< 400	< 390	< 410	< 1500	< 750	18 J	< 380	18 J	< 400

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 11

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-9
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A3C200135						A3C150118
		Sample ID	VNB9-01-2.5	VNB9-02-2.5	VNB9-02D-2.5	VNB9-03-3.0	VNB9-04-3.0	VNB9-06-4.0	VNB9-05-3.5
		Date Collected	3/19/2003	3/19/2003	3/19/2003	3/19/2003	3/19/2003	3/19/2003	3/13/2003
Metals (total)									
Lead	mg/kg		15.8	14.5	20.0	16.5	19.1	18.3	161

J Estimated result. Result is less than the RL.

B *Estimated result. Result is less than the RL. (Metals only)*

E Matrix interference.

TABLE 12

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-11
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A3D160123	A4E070272	A4H100153
		Sample ID	VNB11-01-2.0	B11-01-48"	B11-02-96"
		Date Collected	4/15/2003	5/6/2004	
Volatile Organic Compounds					
Acetone	ug/kg		---	< 1,100	19 J,B
Ethylbenzene	ug/kg		---	81 J	
Methylene Chloride	ug/kg		---	150 J, B	4.6 J, B
Metals (total)					
Lead	mg/kg		25.8		8.3
PCBs	ug/kg		---	< 40	---
PAHs					
Naphthalene	ug/kg		---	11,000 J	---
2-Methylnaphthalene	ug/kg		---	100,000	---
Fluorene	ug/kg		---	12,000 J	---
Phenanthrene	ug/kg		---	25,000 J	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 13

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-12
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A3D180175			
		Sample ID	VNB12-01-3.0	VNB12-01D-3.0	VNB12-02-3.0	VNB12-03-2.5
		Date Collected	4/17/2003	4/17/2003	4/17/2003	4/17/2003
Volatile Organic Compounds						
Acetone	ug/kg		9.3 J	11 J	45	< 28
2-Butanone	ug/kg		< 33	1.8 J	7.5 J	< 28
Metals (total)						
Lead	mg/kg		8.9	9.7	28.4	11.5
PAHs						
Naphthalene	ug/kg		< 380	< 380	42 J	< 380
2-Methylnaphthalene	ug/kg		< 380	< 380	100 J	51 J
Acenaphthene	ug/kg		< 380	< 380	310 J	< 380
Dibenzofuran	ug/kg		< 380	< 380	250 J	< 380
Fluorene	ug/kg		< 380	< 380	470	54 J
Phenanthrene	ug/kg		< 380	< 380	320 J	< 380
Anthracene	ug/kg		< 380	< 380	120 J	< 380
Fluoranthene	ug/kg		< 380	< 380	77 J	< 380
Pyrene	ug/kg		< 380	< 380	96 J	< 380
Benzo (a) anthracene	ug/kg		< 380	< 380	37 J	< 380
Chrysene	ug/kg		< 380	< 380	50 J	< 380
bis (2-Ethylhexyl) phthalate	ug/kg		600	850	470	200 J
Benzo (b) fluoranthene	ug/kg		< 380	< 380	49 J	< 380
Benzo (k) fluoranthene	ug/kg		< 380	< 380	19 J	< 380
Benzo (a) pyrene	ug/kg		< 380	< 380	26 J	< 380
Indeno (1,2,3-cd) pyrene	ug/kg		< 380	< 380	26 J	< 380
Benzo (ghi) perylene	ug/kg		< 380	< 380	29 J	< 380

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 14

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-13
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A3D190125				A3D220132		
		Sample ID	VNB13-04-4.0	VNB13-04D-4.0	VNB13-05-3.0	VNB13-06-2.5	VNB13-01-3.0	VNB13-02-3.0	VNB13-03-3.0
		Date Collected	4/18/2003	4/18/2003	4/18/2003	4/18/2003	4/21/2003	4/21/2003	4/21/2003
Volatile Organic Compounds									
Acetone	ug/kg		21 J	23 J	23 J	51	13 J	< 31	12 J
Benzene	ug/kg		0.45 J	< 6.0	< 6.9	< 7.2	< 7.8	< 7.8	< 5.3
2-Butanone	ug/kg		4.0 J	3.4 J	5.6 J	9.5 J	< 31	< 31	2.0 J
Ethylbenzene	ug/kg		6.3	1.8 J	18	< 7.2	< 7.8	< 7.8	< 5.3
4-Methyl-2-pentanone	ug/kg		< 22	2.4 J	< 28	< 29	< 31	< 31	< 21
Toluene	ug/kg		< 5.4	< 6.0	< 6.9	2.8 J	< 7.8	< 7.8	< 5.3
Xylenes (total)	ug/kg		9.3 J	< 12	9.4 J	< 14	< 16	< 16	< 11
Metals (total)									
Lead	mg/kg		12.4	13.2	12.3	13.5	14.5	14.0	9.0
PAHs									
Phenol	ug/kg		< 400	< 390	< 8,200	27 J	< 380	< 780	< 790
Naphthalene	ug/kg		3,500 J	5,400 J	2,200 J	< 400	< 380	< 780	< 790
2-Methylnaphthalene	ug/kg		22,000	34,000	17,000	94 J	< 380	< 780	< 790
Acenaphthene	ug/kg		970 J	< 390	1,100 J	110 J	< 380	< 780	< 790
Dibenzofuran	ug/kg		< 400	< 390	< 8,200	70 J	< 380	< 780	< 790
Fluorene	ug/kg		1,600 J	2,400 J	1,800 J	200 J	< 380	< 780	< 790
Phenanthrene	ug/kg		4,400 J	6,700 J	4,400 J	390 J	< 380	< 780	< 790
Anthracene	ug/kg		360 J	390	< 8,200	47 J	< 380	< 780	< 790
Carbazole	ug/kg		< 400	160 J	< 8,200	< 400	< 380	< 780	< 790
Fluoranthene	ug/kg		46 J	< 390	< 8,200	< 400	< 380	< 780	< 790
Pyrene	ug/kg		180 J	240 J	< 8,200	< 400	< 380	< 780	< 790
bis (2-Ethylhexyl) phthalate	ug/kg		2,900 J	3,100 J	13,000	500	1,200	2,400	2,300

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 15

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-16
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number		
	Units	Sample ID	VNB16-01-38"
		Date Collected	3/15/2004
Metals (total)			
Lead	mg/kg		12.2

J Estimated result. Result is less than the RL.

B Estimated result. Result is less than the RL. (Metals only)

E Matrix interference.

TABLE 16

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-18
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number		
		Sample ID	VNB18-01-32"	VNB18-02-42"
		Date Collected	3/15/2004	3/15/2004
Metals (total)				
Lead	mg/kg		11.3	13.8

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 17

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-19
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number			
	Units	Sample ID / Date Collected	VNB19-01-48" 3/10/2004	VNB19-02-32" 3/10/2004
Metals (total)				
Lead	mg/kg		9.2	8.7

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 18

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-20
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number		
	Units	Sample ID	VNB20-01-42"
		Date Collected	3/10/2004
Metals (total)			
Lead	mg/kg		14.5

J Estimated result. Result is less than the RL.

B Estimated result. Result is less than the RL. (Metals only)

E Matrix interference.

TABLE 19

SUMMARY OF VERIFICATION SAMPLING RESULTS - NORTH YARD AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number		A4C260134									A4D060109
	Units	Sample ID	VNNY-01-30"	VNNY-02-16"	VNNY-03-12"	VNNY-04-31"	VNNY-04D-31"	VNNY-05-15"	VNNY-06-18"	VNNY-07-60"	VNNY-08-16"	VNNY-07-85"
		Date Collected	3/25/2004	3/25/2004	3/25/2004	3/25/2004	3/25/2004	3/25/2004	3/25/2004	3/25/2004	3/25/2004	4/5/2004
Metals (total)												
Lead	mg/kg		13.1 E	2010	1650	33.3	52.9	1060	1550	48.9	15.1	30.8
PAHs												
2-Methylnaphthalene	ug/kg		---	---	---	< 410	< 400	30 J	< 420	< 420	< 410	< 390
Diethyl phthalate	ug/kg		---	---	---	< 410	< 400	< 430	< 420	< 420	55 J	< 390
Phenanthrene	ug/kg		---	---	---	< 410	< 400	420 J	76 J	< 420	< 410	< 390
Anthracene	ug/kg		---	---	---	< 410	< 400	98 J	62 J	< 420	< 410	< 390
Fluoranthene	ug/kg		---	---	---	67 J	< 400	120 J	100 J	< 420	< 410	< 390
Pyrene	ug/kg		---	---	---	< 410	< 400	97 J	59 J	< 420	< 410	< 390
Benzo (a) anthracene	ug/kg		---	---	---	< 410	< 400	25 J	29 J	< 420	< 410	< 390
Chrysene	ug/kg		---	---	---	< 410	< 400	46 J	58 J	< 420	< 410	< 390
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	100 J	< 400	42 J	110 J	< 420	< 410	< 390
Benzo (b) fluoranthene	ug/kg		---	---	---	< 410	< 400	51 J	77 J	< 420	< 410	< 390
Benzo (k) fluoranthene	ug/kg		---	---	---	< 410	< 400	< 430	24 J	< 420	< 410	< 390
Benzo (a) pyrene	ug/kg		---	---	---	< 410	< 400	25 J	51 J	< 420	< 410	< 390
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	---	< 410	< 400	90 J	100 J	< 420	< 410	< 390
Dibenz (a, h) anthracene	ug/kg		---	---	---	< 410	<400	< 430	94 J	< 420	< 410	< 390
Benzo (ghi) perylene	ug/kg		---	---	---	< 410	< 400	< 430	36 J	< 420	< 410	< 390
Other PAHs	ug/kg		---	---	---							

J Estimated result. Result is less than the RL.

B Estimated result. Result is less than the RL. (Metals only)

E Matrix interference.

TABLE 20

SUMMARY OF VERIFICATION SAMPLING RESULTS - SOUTH YARD AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A4C100115			A4D130105				
		Sample ID	VNSY-01-50"	VNB23-01-33"	VNSY-02-36"	VNSY-01-27"	VNSY-02-40"	VNSY-03-32"	VNSY-04-48"	VNSY-05-69"
		Date Collected	2/28/2004	3/9/2004	3/10/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004	4/12/2004
Volatile Organic Compounds										
Acetone	ug/kg		---	---	---	---	---	---	---	---
2-Butanone	ug/kg		---	---	---	---	---	---	---	---
1,2-Dichloroethene (total)	ug/kg		---	---	---	---	---	---	---	---
Ethylbenzene	ug/kg		---	---	---	---	---	---	---	---
Methylene Chloride	ug/kg		---	---	---	---	---	---	---	---
Tetrachloroethene	ug/kg		---	---	---	---	---	---	---	---
Toluene	ug/kg		---	---	---	---	---	---	---	---
Trichloroethene	ug/kg		---	---	---	---	---	---	---	---
Xylenes (total)	ug/kg		---	---	---	---	---	---	---	---
Other VOCs	ug/kg									
Metals (total)										
Lead	mg/kg		8.3	17.5	11.1	17.8	12.8	15.6	12.5	7.5 E
PAHs										
1,2-Dichlorobenzene	ug/kg		---	---	---	---	---	---	---	---
4-methylphenol	ug/kg									
Phenanthrene	ug/kg		---	---	---	---	---	---	---	---
Anthracene	ug/kg		---	---	---	---	---	---	---	---
Fluoranthene	ug/kg		---	---	---	---	---	---	---	---
Pyrene	ug/kg		---	---	---	---	---	---	---	---
Benzo (a) anthracene	ug/kg		---	---	---	---	---	---	---	---
Chrysene	ug/kg		---	---	---	---	---	---	---	---
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---	---	---	---
Benzo (b) fluoranthene	ug/kg		---	---	---	---	---	---	---	---
Benzo (k) fluoranthene	ug/kg		---	---	---	---	---	---	---	---
Benzo (a) pyrene	ug/kg		---	---	---	---	---	---	---	---
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	---	---	---	---	---	---
Benzo (ghi) perylene	ug/kg		---	---	---	---	---	---	---	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 20

SUMMARY OF VERIFICATION SAMPLING RESULTS - SOUTH YARD AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A4D140130	A4F030137					A4H140156			A4H180138	
		Sample ID	VNSY-06-45"	VNSY-07-58"	VNSY-08-58"	VNSY-08D-58"	VNSY-09-36"	VNSY-10-55"	VNSY-11-26"	VNSY-12-68"	VNSY-13-44"	VNSY-14-32"	VNSY-15-36"
		Date Collected	4/21/2004	6/2/2004	6/2/2004	6/2/2004	6/2/2004	6/2/2004	8/12/2004	8/12/2004	8/12/2004	8/17/2004	8/17/2004
Volatile Organic Compounds													
Acetone	ug/kg		---	< 2,000	< 4,600	< 2,200	13 J	28 J	---	---	---	---	---
2-Butanone	ug/kg		---	< 2,000	< 4,600	< 2,200	< 37	5.7 J	---	---	---	---	---
1,2-Dichloroethene (total)	ug/kg		---	2,100	6,400	3,800	< 9.3	< 12	---	---	---	---	---
Ethylbenzene	ug/kg		---	< 510	140 J	100 J	0.83 J	< 12	---	---	---	---	---
Methylene Chloride	ug/kg		---	250 J, B	510 J, B	260 J, B	4.6 J, B	5.9 J, B	---	---	---	---	---
Tetrachloroethene	ug/kg		---	< 510	820 J	700	< 9.3	< 12	---	---	---	---	---
Toluene	ug/kg		---	< 510	110 J	74 J	4.8 J	< 12	---	---	---	---	---
Trichloroethene	ug/kg		---	230 J	26,000	20,000	3.4 J	1.6 J	---	---	---	---	---
Xylenes (total)	ug/kg		---	< 1,000	420 J	410 J	6.3 J	< 24	---	---	---	---	---
Other VOCs	ug/kg												
Metals (total)													
Lead	mg/kg		13.5	88.3	23.5	16.0	1,060	17.2	15.7	9.6	8.3	20.7	16.9
PAHs													
1,2-Dichlorobenzene	ug/kg		---	< 420	100 J	94 J	< 430	< 450					
4-methylphenol	ug/kg			< 420	< 440	< 430	28 J, #	< 450					
Phenanthrene	ug/kg		---	< 420	< 440	< 430	110 J	170 J					
Anthracene	ug/kg		---	< 420	< 440	< 430	26 J	< 450					
Fluoranthene	ug/kg		---	< 420	< 440	< 430	210 J	< 450					
Pyrene	ug/kg		---	< 420	< 440	< 430	170 J	< 450					
Benzo (a) anthracene	ug/kg		---	< 420	< 440	< 430	81 J	< 450					
Chrysene	ug/kg		---	< 420	< 440	< 430	110 J	< 450					
bis (2-Ethylhexyl) phthalate	ug/kg		---	< 420	< 440	< 430	< 430	25 J					
Benzo (b) fluoranthene	ug/kg		---	< 420	< 440	< 430	130 J	< 450					
Benzo (k) fluoranthene	ug/kg		---	< 420	< 440	< 430	59 J	< 450					
Benzo (a) pyrene	ug/kg		---	< 420	< 440	< 430	97 J	< 450					
Indeno (1,2,3-cd) pyrene	ug/kg		---	< 420	< 440	< 430	66 J	< 450					
Benzo (ghi) perylene	ug/kg		---	< 420	< 440	< 430	70 J	< 450					

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 21

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-25 AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	STL Lot Number		A4D220143						A4E210150	
	Units	Sample ID	VNB25-01-28"	VNB25-02-38"	VNB25-03-32"	VNB25-04-16"	VNB25-05-18"	VNB25-06-14"	VNB25-07-12"	VNB25-07D-12"
		Date Collected	4/21/2004	4/21/2004	4/21/2004	4/21/2004	4/21/2004	4/21/2004	5/20/2004	5/20/2004
Metals (total) Lead	mg/kg		10.5 E	15.1	11.8	13.5	5140	1890	9,090	10,000
PCBs Aroclor 1254	ug/kg		< 44	< 40	< 39	< 37	43	41	---	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 21

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDING B-25 AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	Sample ID / Date Collected	A4E210150						A4E290126		A4F040147	
		Sample ID	VNB25-08-12"	VNB25-09-12"	VNB25-10-12"	VNB25-11-32"	VNB25-12-32"	VNB25-13-32"	VNB25-14-33"	VNB25-15-18"	VNB25-16-18"	VNB25-17-8"
		Date Collected	5/20/2004	5/20/2004	5/20/2004	5/20/2004	5/20/2004	5/20/2004	5/27/2004	5/27/2004	6/2/2004	6/2/2004
Metals (total)												
Lead	mg/kg		1,030	59.5	12.4	11.2	38.7	15.8	50.8	66.3	127	192
PCBs												
Aroclor 1254	ug/kg		---	---	---	---	---	---	---	---	---	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 22

SUMMARY OF VERIFICATION SAMPLING RESULTS - BUILDINGS C8/C9
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A4F050115					
		Sample ID	VNC8C9-01-12"	VNC8C9-02-24"	VNC8C9-03-9"	VNC8C9-04-10"	VNC8C9-05-12"	VNC8C9-06-15"
		Date Collected	6/4/2004	6/4/2004	6/4/2004	6/4/2004	6/4/2004	6/4/2004
Metals (total)								
Lead	mg/kg		26.4	12.7	116	247	755	196

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 23

SUMMARY OF VERIFICATION SAMPLING RESULTS - NORTHWEST STORAGE BUILDING AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A4G310133							
		Sample ID	VNWS-10-24"	VNWS-11-46"	VNWS-12-29"	VNWS-13-44"	VNWS-14-22"	VNWS-15-23"	VNWS-16-23"	VNWS-17-29"
		Date Collected	7/29/2004	7/29/2004	7/29/2004	7/29/2004	7/29/2004	7/29/2004	7/29/2004	7/29/2004
Volatile Organic Compounds										
Acetone	ug/kg		---	---	---	---	< 5,600	< 45	< 2,300	---
Benzene	ug/kg		---	---	---	---	< 1,400	2.8 J	37 J	---
2-Butanone	ug/kg		---	---	---	---	490 J	5.3 J	180 J	---
Carbon disulfide	ug/kg		---	---	---	---	< 1,400	< 11	< 590	---
1,2-Dichloroethene (total)	ug/kg		---	---	---	---	< 1,400	< 11	< 590	---
Ethylbenzene	ug/kg		---	---	---	---	< 1,400	< 11	160 J	---
Methylene Chloride	*ug/kg*		---	---	---	---	1,800	< 11	770	---
Tetrachloroethene	ug/kg		---	---	---	---	< 1,400	< 11	< 590	---
Toluene	ug/kg		---	---	---	---	< 1,400	< 11	< 590	---
Trichloroethene	ug/kg		---	---	---	---	< 1,400	1.6 J	< 590	---
Xylenes (total)	ug/kg		---	---	---	---	< 2,800	1.7 J	310 J	---
Metals (total)										
Lead	mg/kg		12.7 E	12.0	11.0	15.2	115	14.3	14.6	203
PCBs										
Aroclor 1254	ug/kg		---	---	---	---	< 70	< 44	< 40	---
PAHs										
Naphthalene	ug/kg		---	---	---	---	< 17,000	< 4,400	5,600 J	---
2-Methylnaphthalene	ug/kg		---	---	---	---	< 17,000	940 J	26,000	---
Fluorene	ug/kg		---	---	---	---	< 17,000	< 4,400	3,200 J	---
Phenanthrene	ug/kg		---	---	---	---	< 17,000	< 4,400	7,500 J	---
Anthracene	ug/kg		---	---	---	---	< 17,000	< 4,400	1,400 J	---
Fluoranthene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Pyrene	ug/kg		---	---	---	---	< 17,000	< 4,400	1,000 J	---
Benzo (a) anthracene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Chrysene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	1,200 J	< 4,400	< 8,100	---
Benzo (b) fluoranthene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Benzo (k) fluoranthene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Benzo (a) pyrene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Dibenz (a, h) anthracene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---
Benzo (ghi) perylene	ug/kg		---	---	---	---	< 17,000	< 4,400	< 8,100	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 23

SUMMARY OF VERIFICATION SAMPLING RESULTS - NORTHWEST STORAGE BUILDING AREA
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

Analytical Parameter	Units	STL Lot Number	A4H120123		A4G130128			A4G170170			A4G220176		
		Sample ID	VNWS-18-36"	VNWS-19-30"	VNWS-01-22"	VNWS-02-36"	VNWS-03-32"	VNWS-04-24"	VNWS-05-13"	VNWS-06-7"	VNWS-07-38"	VNWS-08-34"	VNWS-09-14"
		Date Collected	8/11/2004	8/11/2004	7/12/2004	7/12/2004	7/12/2004	7/16/2004	7/16/2004	7/16/2004	7/21/2004	7/21/2004	7/21/2004
Volatile Organic Compounds													
Acetone	ug/kg		46 B	980 J, B	---	---	---	23 J,B,U	39 B,U	34 B, U	---	---	---
Benzene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
2-Butanone	ug/kg		5.1 J	---	---	---	---	---	9.1 J	---	---	---	---
Carbon disulfide	ug/kg		---	---	---	---	---	5.4 J	---	---	---	---	---
1,2-Dichloroethene (total)	ug/kg		---	---	---	---	---	---	---	1.4 J	---	---	---
Ethylbenzene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
Methylene Chloride	ug/kg		6.6	---	---	---	---	---	---	---	---	---	---
Tetrachloroethene	ug/kg		---	---	---	---	---	4.1 J	---	---	---	---	---
Toluene	ug/kg		---	50 J, B	---	---	---	---	---	---	---	---	---
Trichloroethene	ug/kg		---	---	---	---	---	---	---	1.7 J	---	---	---
Xylenes (total)	ug/kg		---	---	---	---	---	---	---	---	---	---	---
Metals (total)													
Lead	mg/kg		11.2 J	15.3 J	14.7 J	16.2 J	21.9 J	33.1 J	395 J	5,700 J	15.5	130 J	251 J
PCBs													
Aroclor 1254	ug/kg		---	---	---	---	---	190 J	310 J	---	---	---	---
PAHs													
Naphthalene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
2-Methylnaphthalene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
Fluorene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
Phenanthrene	ug/kg		---	---	---	---	---	---	---	250 J	---	---	---
Anthracene	ug/kg		---	---	---	---	---	---	---	---	---	---	---
Fluoranthene	ug/kg		---	---	---	---	---	---	---	810 J	---	---	---
Pyrene	ug/kg		---	---	---	---	---	---	---	860 J	---	---	---
Benzo (a) anthracene	ug/kg		---	---	---	---	---	---	---	600 J	---	---	---
Chrysene	ug/kg		---	---	---	---	---	---	---	590 J	---	---	---
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---	---	76 J, B	---	---	---	---
Benzo (b) fluoranthene	ug/kg		---	---	---	---	---	---	---	650 J	---	---	---
Benzo (k) fluoranthene	ug/kg		---	---	---	---	---	---	---	240 J	---	---	---
Benzo (a) pyrene	ug/kg		---	---	---	---	---	---	---	550 J	---	---	---
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	---	---	---	---	---	270 J	---	---	---
Dibenz (a, h) anthracene	ug/kg		16 J	---	---	---	---	---	---	---	---	---	---
Benzo (ghi) perylene	ug/kg		17 J	---	---	---	---	---	---	200 J	---	---	---

J Estimated result. Result is less than the RL.
B Estimated result. Result is less than the RL. (Metals only)
E Matrix interference.

TABLE 24
SUMMARY OF VAULT CONTENT ANALYTICAL RESULTS
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO
CEC PROJECT NO. 220931.0076

Analytical Parameter			
	STL Lot Number	A4E190107	A4E190103
	Sample ID	SY-VAULT-01 (Oil)	SY-VAULT-02 (Water)
	Date	5/11/2004	5/12/2004
Volatile Organic Compounds			
Acetone		1.5 mg/kg	0.0047 J mg/L
Vinyl chloride		< 5.5 mg/kg	0.047 mg/L
1,2-Dichloroethene (total)		0.340 J mg/kg	0.098
Ethylbenzene		0.350 J mg/kg	<0.0033 mg/L
Methylene Chloride		3.0 mg/kg	<0.0033 mg/L
Toluene		0.190 J mg/kg	<0.0033 mg/L
Xylenes (Total)		12 mg/kg	0.0038 mg/L
Semi-Volatile Organic Compounds			
Benzo(g,h,i)perylene		<1,000 mg/kg	0.058 J mg/L
Dibenz(a,h) anthracene		<1,000 mg/kg	0.068 J mg/L
Indeno (1,2,3-cd) pyrene		<1,000 mg/kg	0.057 J mg/L
bis (2-Ethylhexyl) phthalate		<1,000 mg/kg	0.022 J,B mg/L
Phenanthrene		170 J mg/kg	0.043 J mg/L
PCBs			
Aroclor 1254		14 mg/kg	0.0046 mg/L
Metals			
Arsenic		0.97 B mg/kg	0.0043 B[1] mg/L
Barium		3.1 B mg/kg	0.15 B[1] mg/L
Cadmium		< 0.50 mg/kg	0.00050 B[1] mg/L
Chromium		0.48 B, J mg/kg	0.012 [1] mg/L
Lead		11.4 mg/kg	0.22 [1] mg/L
Selenium		0.37 B mg/kg	0.0071 [1] mg/L
Silver		0.13 B mg/kg	0.00077 B [1] mg/L
Mercury		0.014 B, J mg/kg	< 0.00020 [1] mg/L

J Estimated result. Result is less than the reporting limit.

B Method Blank Contamination. The associated method blank contains the target analyte at a reportable level. (Metals only)

[1] Sample collected on June 4, 2004. Identified as SY-VAULT-02A

TABLE 25
SUMMARY OF VERIFICATION SAMPLING RESULTS - SOUTH YARD AREA (2004)
FORMER EAGLEPICHER INCORPORATED
DELTA, OHIO

PARAMETER	UNITS	South Yard			
		VNSY-07-58" 6/2/2004	VNSY-08-58" 6/2/2004	VNSY-09-36" 6/2/2004	VNSY-10-55" 6/2/2004
Volatile Organic Compounds					
Acetone	mg/kg	<2	<4.6	0.013 J	0.028 J
2-Butanone	mg/kg	<2	<4.6	<0.037	0.0057 J
1,2-Dichloroethene (total)	mg/kg	2.1	6.4	<0.0093	<0.012
Ethylbenzene	mg/kg	<0.51	0.14 J	0.0008 J	<0.012
Methylene Chloride	mg/kg	0.25 J	0.51 J	0.0046	0.0059 J
Toluene	mg/kg	<0.51	0.11 J	0.0048 J	<0.012
Trichloroethene	mg/kg	0.23 J	26	0.0034 J	0.0016 J
Vinyl chloride	mg/kg	<0.51	<1.1	<0.0093	<0.012
Xylenes (total)	mg/kg	<2	0.42 J	0.0063 J	<0.024
Tetrachloroethene	mg/kg	<0.51	0.82 J	<0.0093	<0.012
Semi-Volatile Organic Compounds					
1,2-Dichlorobenzene	mg/kg	<0.42	0.100 J	<0.43	<0.45
Phenanthrene	mg/kg	<0.42	<0.44	0.110 J	0.170 J
Anthracene	mg/kg	<0.42	<0.44	0.026 J	<0.45
Fluoranthene	mg/kg	<0.42	<0.44	0.210 J	<0.45
Pyrene	mg/kg	<0.42	<0.44	0.170 J	<0.45
Benzo (a) anthracene	mg/kg	<0.42	<0.44	0.081 J	<0.45
Chrysene	mg/kg	<0.42	<0.44	0.110 J	<0.45
bis (2-Ethylhexyl) phthalate	mg/kg	<0.42	<0.44	<0.43	0.025 J
4-Methylphenol	mg/kg	<0.42	<0.44	0.0028 J#	<0.45
Benzo (b) fluoranthene	mg/kg	<0.42	<0.44	0.130 J	<0.45
Benzo (k) fluoranthene	mg/kg	<0.42	<0.44	0.059 J	<0.45
Benzo (a) pyrene	mg/kg	<0.42	<0.44	0.097 J	<0.45
Indeno (1,2,3-cd) pyrene	mg/kg	<0.42	<0.44	0.066 J	<0.45
Benzo (ghi) perylene	mg/kg	<0.42	<0.44	0.070 J	<0.45

J Estimated result. Result is less than the RL.
This value represents a probable combination of 3-methylphenol (m-cresol) and 4-methylphenol (p-cresol)

TABLE 26
SUMMARY OF SOIL ANALYTICAL RESULTS - SOUTH YARD AREA
FORMER EAGLEPICHER INCORPORATED

Analytical Parameter	Units	STL Lot Number	A4G240140															
		Sample ID	GB-2 (8-10')	GB-4 (8-10')	GB-5 (10-12')	GB-5D (10-12')	GB-8 (8-10')	GB-9 (8-10')	GB-11 (8-10')	GB-12 (4-6')	GB-13 (6-8')	GB-13D (6-8')	GB-15 (2-4')	GB-15 (6-8')	GB-16 (4-6')	GB-17 (4-6')	GB-18 (8-10')	GB-19 (8-10')
		Date Collected	7/21/2004	7/21/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/21/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/22/2004	7/23/2004	7/23/2004	7/23/2004
Volatile Organic Compounds																		
Acetone	ug/kg		< 310,000	4.9 J	< 150,000	28,000 J	< 19	< 18	3.6 J	11 J	360 J	< 3,700	< 9,900	3.5 J	< 180,000	< 2,100,000	< 20	< 230,000
Benzene	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
2-Butanone	ug/kg		< 310,000	< 17	< 150,000	< 190,000	< 19	< 18	< 18	1.8 J	< 3,000	< 3,700	< 9,900	< 18	< 180,000	< 2,100,000	< 20	< 230,000
Carbon disulfide	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
Chloroethane	ug/kg		< 77,000	2.6 J	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
1,1-Dichloroethane	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	1.5 J	1.3 J	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
1,1-Dichloroethene	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	1.9 J	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
1,2-Dichloroethene (total)	ug/kg		< 77,000	0.76 J	< 39,000	< 47,000	9.7	130	46	31	16,000	15,000	87,000	4.6	7,800 J	< 520,000	0.99 J	< 59,000
Ethylbenzene	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4 8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
2-Hexanone	ug/kg		< 310,000	< 17	< 150,000	< 190,000	< 19	< 18	< 18	< 19	< 3,000	< 3,700	< 9,900	< 18	< 180,000	< 2,100,000	< 20	< 230,000
Methylene Chloride	ug/kg		< 77,000	1 7 J	< 39,000	< 47,000	2.3 J	3.1 J	2.6 J	2.7 J	< 750	< 920	< 2,500	2.3 J	< 46,000	< 520,000	3.5 J	< 59,000
4-Methyl-2-pentanone	ug/kg		< 310,000	< 17	< 150,000	< 190,000	< 19	< 18	< 18	< 19	< 3,000	< 3,700	< 9,900	< 18	< 180,000	< 2,100,000	< 20	< 230,000
Styrene	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	130,000 J	< 5.0	< 59,000
Tetrachloroethene	ug/kg		17,000 J	< 4.2	4,600 J	5,300 J	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	8,600 J	190,000 J	< 5.0	36,000 J
Toluene	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
Trichloroethene	ug/kg		1,800,000	1.8 J	790,000	1,200,000	1.4 J	16	< 4.5	< 4.9	620 J	800 J	6,400	4.3 J	1,100,000	13,000,000	0.95 J	1,500,000
Vinyl chloride	ug/kg		< 77,000	1.3 J	< 39,000	< 47,000	< 4.8	5.4	190	61	1,800	2,000	2,300 J	19	< 46,000	< 520,000	2.8 J	< 59,000
Xylenes (total)	ug/kg		< 150,000	< 8.4	< 77,000	< 94,000	< 9.6	< 9.1	< 9.0	< 9.7	< 1,500	< 1,800	< 4,900	< 9.2	< 92,000	71,000 J	< 10	< 120,000
Other VOCs	ug/kg		< 77,000	< 4.2	< 39,000	< 47,000	< 4.8	< 4.6	< 4.5	< 4.9	< 750	< 920	< 2,500	< 4.6	< 46,000	< 520,000	< 5.0	< 59,000
Metals (total)																		
Arsenic	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Barium	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Cadmium	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chromium	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lead	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nickel	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Selenium	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Silver	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mercury (total)	mg/kg		---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCBs																		
Aroclor 1016	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1221	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1232	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1242	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1248	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1254	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Aroclor 1260	ug/kg		---	---	< 39	< 39	---	---	---	---	---	---	---	---	< 38	< 41	---	< 39
Percent Solids	%		85.9	85.8	85.4	85.7	86.1	86.4	85.9	81.4	86.4	86.2	84.3	88.3	86.2	79.5	85.9	84.6
PAHs																		
Phenol	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
1,2-Dichlorobenzene	ug/kg		---	---	140 J	100 J	---	---	---	---	---	---	---	---	75 J	1,600	---	< 390
4-Methylphenol	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Naphthalene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
2-Methylnaphthalene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Acenaphthene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Dibenzofuran	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Diethyl phthalate	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Fluorene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Phenanthrene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Anthracene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Carbazole	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Fluoranthene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Pyrene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Benzo (a) anthracene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Chrysene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Benzo (b) fluoranthene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Benzo (k) fluoranthene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Benzo (a) pyrene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Dibenz (a, h) anthracene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Benzo (ghi) perylene	ug/kg		---	---	< 390	< 390	---	---	---	---	---	---	---	---	< 380	< 410	---	< 390
Other PAHs	ug/kg		---	---	< 390 - 1,900	< 390 - 1,900	---	---	---	---	---	---	---	---	< 380 - 1,900	< 410 - 2,000	---	< 390 - 1,900

J Estimated result. Result is less than the RL

--- Not Analyzed

Date Printed: 1/6/2009

TABLE 26
SUMMARY OF SOIL ANALYTICAL RESULTS - SOUTH YARD AREA
FORMER EAGLEPICHER INCORPORATED

Analytical Parameter	Units	STL Lot Number	A4G280154	A4G310139	A4G280154		A4G310139
		Sample ID	GB-20 (8-10')	GB-21 (8-10')	GB-22 (4-8')	GB-22 (8-10')	GB-23 (8-10')
		Date Collected	7/24/2004	7/30/2004	7/24/2004	7/24/2004	7/30/2004
Volatile Organic Compounds							
Acetone	ug/kg		< 2,300	21 J	17 J	11 J	< 2,200
Benzene	ug/kg		< 580	< 6.9	1.6 J	0.79 J	< 540
2-Butanone	ug/kg		< 2,300	< 28	< 38	< 26	< 2,200
Carbon disulfide	ug/kg		< 580	< 6.9	< 9.6	< 6.5	< 540
Chloroethane	ug/kg		< 580	< 6.9	< 9.6	< 6.5	< 540
1,1-Dichloroethane	ug/kg		< 580	< 6.9	1.2 J	0.49 J	< 540
1,1-Dichloroethene	ug/kg		< 580	< 6.9	4.8 J	1.4 J	< 540
1,2-Dichloroethene (total)	ug/kg		2,000	< 6.9	260	92	1,300
Ethylbenzene	ug/kg		< 580	< 6.9	< 9.6	< 6.5	< 540
2-Hexanone	ug/kg		< 2,300	< 28	< 38	< 26	< 2,200
Methylene Chloride	ug/kg		< 580	< 6.9	< 9.6	< 6.5	450 J
4-Methyl-2-pentanone	ug/kg		< 2,300	< 28	< 38	< 26	< 2,200
Styrene	ug/kg		< 580	< 6.9	< 9.6	< 6.5	180 J
Tetrachloroethene	ug/kg		< 580	< 6.9	< 9.6	< 6.5	91 J
Toluene	ug/kg		< 580	0.46 J	< 9.6	< 6.5	< 540
Trichloroethene	ug/kg		< 580	0.97 J	21	14	280 J
Vinyl chloride	ug/kg		290 J	< 6.9	7.7 J	5.1 J	< 540
Xylenes (total)	ug/kg		< 1,200	< 14	< 19	< 13	<1,100
Other VOCs	ug/kg		< 580	< 6.9	< 9.6	< 6.5	< 540
Metals (total)							
Arsenic	mg/kg		---	---	---	---	---
Barium	mg/kg		---	---	---	---	---
Cadmium	mg/kg		---	---	---	---	---
Chromium	mg/kg		---	---	---	---	---
Lead	mg/kg		---	---	---	---	---
Nickel	mg/kg		---	---	---	---	---
Selenium	mg/kg		---	---	---	---	---
Silver	mg/kg		---	---	---	---	---
Mercury (total)	mg/kg		---	---	---	---	---
PCBs							
Aroclor 1016	ug/kg		---	---	---	---	---
Aroclor 1221	ug/kg		---	---	---	---	---
Aroclor 1232	ug/kg		---	---	---	---	---
Aroclor 1242	ug/kg		---	---	---	---	---
Aroclor 1248	ug/kg		---	---	---	---	---
Aroclor 1254	ug/kg		---	---	---	---	---
Aroclor 1260	ug/kg		---	---	---	---	---
Percent Solids							
	%		86.3	86.1	86.9	85.9	85.0
PAHs							
Phenol	ug/kg		---	---	---	---	---
1,2-Dichlorobenzene	ug/kg		---	---	---	---	---
4-Methylphenol	ug/kg		---	---	---	---	---
Naphthalene	ug/kg		---	---	---	---	---
2-Methylnaphthalene	ug/kg		---	---	---	---	---
Acenaphthene	ug/kg		---	---	---	---	---
Dibenzofuran	ug/kg		---	---	---	---	---
Diethyl phthalate	ug/kg		---	---	---	---	---
Fluorene	ug/kg		---	---	---	---	---
Phenanthrene	ug/kg		---	---	---	---	---
Anthracene	ug/kg		---	---	---	---	---
Carbazole	ug/kg		---	---	---	---	---
Fluoranthene	ug/kg		---	---	---	---	---
Pyrene	ug/kg		---	---	---	---	---
Benzo (a) anthracene	ug/kg		---	---	---	---	---
Chrysene	ug/kg		---	---	---	---	---
bis (2-Ethylhexyl) phthalate	ug/kg		---	---	---	---	---
Benzo (b) fluoranthene	ug/kg		---	---	---	---	---
Benzo (k) fluoranthene	ug/kg		---	---	---	---	---
Benzo (a) pyrene	ug/kg		---	---	---	---	---
Indeno (1,2,3-cd) pyrene	ug/kg		---	---	---	---	---
Dibenz (a, h) anthracene	ug/kg		---	---	---	---	---
Benzo (ghi) perylene	ug/kg		---	---	---	---	---
Other PAHs	ug/kg		---	---	---	---	---

J Estimated result. Result is less than the RL.
--- Not Analyzed

APPENDIX I

LABORATORY REPORTS – ONSITE REMOVAL – 2002 THROUGH 2005

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